ANALYSIS, PRELIMINARY DETERMINATION AND DRAFT PERMIT

FOR

ROCKWELL LIME COMPANY

LOCATED AT

4110 ROCKWOOD ROAD
MANITOWOC

MANITOWOC COUNTY, WISCONSIN

ON THE OPERATION OF

A LIME MANUFACTURING FACILITY

This review was performed by the Wisconsin Department of Natural Resources in accordance with Sections 285.60 to 285.65, Wis. Stats and Chapter NR 407, Wis. Adm. Code. This review is for a Part 70 source located in an area which is designated nonattainment for ozone and attainment/unclassified for all other criteria pollutants.

Air Pollution Control Operation Permit 436034390-P01
Analysis, Preliminary Determination
and Draft Permit prepared by: James G. Crawford Date _____

Approval Element	Initials and Date
Preliminary Determination Document (including calculations)	
Applicable Requirement	
Compliance Documentation Methods (compliance inspector concurrence)	
Compliance Plan and Schedule	
Federal Enforceability of Permit Conditions (synthetic minor conditions)	

Approved for Public Review and Comment: _____ Date: _____

cc: AM/7 - FOP
Manitowoc Public Library, 808 Hamilton Street, Manitowoc, WI 54220-5390

INTRODUCTION

Sources which are not exempt from the operation permit requirements under Section 407.03, Wis. Adm. Code, are required to obtain an air pollution control operation permit. Sources subject to the requirements must submit a permit application to the Department of Natural Resources by the date set forth in Sections 285.62(11)(b)1., Wis. Stats., and NR 407.04, Wis. Adm. Code. The application is then reviewed following the provisions set forth in Sections 285.62, 285.63 and 285.64, Wis. Stats., and Chapter NR 407, Wis. Adm. Code.

Subject sources are to be reviewed for their air pollution control technology and for their impact upon the air quality. This is to insure compliance with all applicable rules and statutory requirements. The review will show why the source(s) operation should be approved, conditionally approved, or disapproved. It will encompass emission calculations and air quality analysis using U.S. EPA models, if applicable. Emissions from volatile organic compound (VOC) sources and small sources whose emissions are known to be insignificant are normally not modeled. As a precautionary note, the emission estimates may be based on U.S. EPA emission factors (AP-42) or theoretical data and can vary from actual stack test data.

This review is based on information contained within the application submitted for an air pollution control operation permit. An operation permit may be issued if the criteria set forth in sections 285.63 and 285.64, Wis. Stats., are met.

A final decision on the operation permit will not be made until the public has had an opportunity to comment on the Department's analysis, preliminary determination and draft permit. The conditions proposed in the draft permit may be revised in any final permit issued based on comments received or further evaluation by the Department.

Owner/Operator: Rockwell Lime Company
4110 Rockwood Road
Manitowoc, WI 54220

Responsible Official: Jim Brisch
President
(920) 682-7771

Permit Contact Person: Don Brisch - VP Operations

Date of Administratively Complete Application: 05/22/95

Dates of Submittal: March 15, 1998 (quarry data), April 20, 1999 (Don said to take the fluff and propane out of the application).

SOURCE DESCRIPTION

Rockwell Lime Company owns and operates a lime manufacturing facility in Rockwood, Wisconsin. The facility's product line includes sized limestone, quicklime (CaO-MgO), and a variety ofhydrated lime (slaked MgO-CaO). The major potential sources of air pollutants include:

1. #1 Kiln;
2. #2 Kiln;
3. Pressure hydrator;
4. Atmospheric hydrator;
5. Assorted crushing/milling/screening operations;
6. Material transfer operations (conveying, loading/unloading);
7. Dust collector associated with material transfer operations and silo/tanks;
8. Hydrated lime bagging operations; and
9. Unpaved roads within plant and outside of quarry.

SIGNIFICANT EMISSIONS UNITS

This section summarizes detailed stack and process information.

1. STACK INFORMATION

Stack Identification Number:	S08
Exhausting Unit(s):	P04
This stack has an actual exhaust point:	No
Discharge height above ground level (ft):	-1.0
Inside dimensions at outlet (ft):	
Exhaust flow rate (Normal) (ACFM):	-1
Exhaust gas temperature (Normal) (°F):	-1
Exhaust gas discharge direction:	
Stack equipped with any obstruction:	

A. Emission Unit Information

Process number:	P04
Unit description:	New Conveyors, Silo, Tank, For Limestone Feed To Kilns
Material transfer:	Truck Unloading and Coneying of Limestone to the Silos/Stone Tanks
Control technology status:	Uncontrolled
Date of construction or last modification:	00/00/89
Construction Permit:	none

Raw materials	Maximum Usage
Limestone	250 TPH

Finished products	Maximum produced
Limestone	250 TPH

2. STACK INFORMATION

Stack Identification Number:	S08
Exhausting Unit(s):	P05
This stack has an actual exhaust point:	No
Discharge height above ground level (ft):	-1.0
Inside dimensions at outlet (ft):	
Exhaust flow rate (Normal) (ACFM):	-1
Exhaust gas temperature (Normal) (°F):	-1
Exhaust gas discharge direction:	
Stack equipped with any obstruction:	

A. Emission Unit Information

Process number:	P05
Unit description:	Old Conveyors, Silo, Tank, For Limestone Feed To Kilns

Material transfer: Truck Unloading and Coneying of Limestone to the Silos/Stone Tanks
Control technology status: Uncontrolled
Date of construction or last modification: 00/00/52
Construction Permit: none

Raw materials	Maximum Usage
Limestone	250 TPH

Finished products	Maximum produced
Limestone	250 TPH

3. STACK INFORMATION
Stack Identification Number: S09
Exhausting Unit(s): P06
This stack has an actual exhaust point: No
Discharge height above ground level (ft): -1.0
Inside dimensions at outlet (ft):
Exhaust flow rate (Normal) (ACFM): -1
Exhaust gas temperature (Normal) (°F): -1
Exhaust gas discharge direction:
Stack equipped with any obstruction:

A. Emission Unit Information
Process number: P06
Unit description: Coal and coke conveying from Coal Pile and Milling to the Kilns
Material transfer: Coal/coke conveying system
Control technology status: Uncontrolled
Date of construction or last modification: 00/00/78
Construction Permit: none

Raw materials	Maximum Usage
Coal/coke	100 TPH

Finished products	Maximum produced
Coal/coke	100 TPH

4. STACK INFORMATION
Stack Identification Number: S11
Exhausting Unit(s): P33 and P36
This stack has an actual exhaust point: Yes
Discharge height above ground level (ft): 77.0
Inside dimensions at outlet (ft): Circular - 6.00
Exhaust flow rate (Normal) (ACFM): 69107
Exhaust gas temperature (Normal) (°F): 450
Exhaust gas discharge direction: Up
Stack equipped with any obstruction: No

A. Emission Unit Information
Process number: P33
Unit description: #1 Lime Kiln
Control technology status: Controlled
Date of construction or last modification: 11/01/52
Construction Permit: none

Raw materials	Maximum Usage
Limestone	12.5 TPH

Finished products	Maximum produced
Quicklime	6.25 TPH

Process fuel types	Maximum Usage
Coal	1.72 TPH
Petrocoke	1.57 TPH
Natural gas	0.044 MMCF/HR

B. Emission Unit Information

Process number: P36
Unit description: #2 Lime Kiln
Control technology status: Controlled
Date of construction or last modification: 12/01/80
Construction Permit: #93-RV-108

Raw materials	MaximumUsage
Limestone	25.0 TPH

Finished products	Maximum produced
Quicklime	12.5 TPH

Process fuel types	Maximum Usage
Coal OR	3.54 TPH, 85 tpd
Coal-coke Blend	3.18 TPH, 76.32 tpd
Natural gas	0.085 MMCF/HR

C. Control devices associated with this emissions unit

Emission unit controlled: P33 and P36
Control device number: C01
Date of installation: 00/00/79
Description of device: FULLER positive pressure reverse jet BAGHOUSE; 8MP5900

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	99.7

Ar = 99%, Be = 99%, Cd = 90%, Total Cr = 95%, Pb = 96%, Mn = 80%, Hg = 50%, Ni = 96%, Se = 90%

Pressure drop across the filter (inches of H2O): 0.5 - 8.0

Filter medium or type of material:	Fiberglass
Maximum inlet gas flow rate (ACFM):	69,107
Maximum inlet gas temperature (°F):	450
Number of bags:	896
Dimensions of bags/filters:	8 in. x 25 ft.
Air to cloth ratio (acfm/ft²):	1.46:1

5. STACK INFORMATION

Stack Identification Number:	S12
Exhausting Unit(s):	P37
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	75.0
Inside dimensions at outlet (ft):	Circular - 2.20
Exhaust flow rate (Normal) (ACFM):	2500
Exhaust gas temperature (Normal) (°F):	190
Exhaust gas discharge direction:	Up
Stack equipped with any obstruction:	No

A. Emission Unit Information

Process number:	P37
Unit description:	Conveyors (P11, P20) and Kennedy Atmospheric Hydrator
Control technology status:	Controlled
Date of construction or last modification:	00/00/54
Construction Permit:	none

Raw materials	Maximum Usage
Quicklime	10 TPH

Finished products	Maximum produced
Hydrated lime	12 TPH

Control devices associated with this emissions unit

Emission unit controlled:	P37
Control device number:	C02
Date of installation:	00/00/54

Description of device: KVS wet cyclone

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	0.00

Liquid flow rate (gal/min):	270.00
Pressure drop across the scrubber and demister (in. H2O):	0.500
Inlet gas flow rate (ACFM):	2500.00
Inlet gas temperature (°F):	190.00
Scrubbing medium:	Water
Liquid inlet pressure (psi):	60.00

6. STACK INFORMATION

Stack Identification Number:	S13
Exhausting Unit(s):	P38
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	75.0
Inside dimensions at outlet (ft):	Circular - 2.20
Exhaust flow rate (Normal) (ACFM):	5200
Exhaust gas temperature (Normal) (°F):	200
Exhaust gas discharge direction:	Up
Stack equipped with any obstruction:	No

A. Emission Unit Information

Process number:	P38
Unit description:	Conveyors (P__, P__) and PressureHydrator
Control technology status:	Controlled
Date of construction or last modification:	06/00/82
Construction Permit:	none

Raw materials	Maximum Usage
Quicklime	15 TPH

Finished products	Maximum produced
Hydrated lime	20.000

Control devices associated with this emissions unit
Emission unit controlled: P38
Control device number: C03
Date of installation: 06/00/82
Description of device: Corison Lime Co wet cyclone

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	-1.000

Liquid flow rate (gal/min): 45.00
Pressure drop across the scrubber and demister (in. H2O): 2.000
Inlet gas flow rate (ACFM): 5200.00
Inlet gas temperature (°F): 200.00
Scrubbing medium: Water
Liquid inlet pressure (psi): 60.00

7. STACK INFORMATION
Stack Identification Number: S14
Exhausting Unit(s): P12
This stack has an actual exhaust point: No
Discharge height above ground level (ft): -1.0
Inside dimensions at outlet (ft):
Exhaust flow rate (Normal) (ACFM): -1
Exhaust gas temperature (Normal) (°F): -1
Exhaust gas discharge direction:
Stack equipped with any obstruction:

A. Emission Unit Information
Process number: P12
Unit description:
Material transfer: Conveyors Kiln quicklime system
Control technology status: Uncontrolled
Date of construction or last modification: 00/00/79
Construction Permit: none

Raw materials	Maximum Usage
Quicklime	20 TPH

Finished products	Maximum produced
Quicklime	20 TPH

8a. STACK INFORMATION
Stack Identification Number: S15a
Exhausting Unit(s): P10a
This stack has an actual exhaust point: Yes
Discharge height above ground level (ft): 35.0
Inside dimensions at outlet (ft): Rectangular - 0.792 by 1.21
Exhaust flow rate (Normal) (ACFM): 1000
Exhaust gas temperature (Normal) (°F): 70
Exhaust gas discharge direction: Up
Stack equipped with any obstruction: No

A. Emission Unit Information
Process number: P10a
Unit description: Crusher QL-28 and Vibrating Screen QL-23
Control technology status: Controlled
Date of construction or last modification: 00/00/86

Construction Permit: none

Raw materials	Maximum Usage
Quicklime	20.000 TPH

Finished products	Maximum produced
Quicklime	20.000 TPH

Control devices associated with this emissions unit
Emission unit controlled: P10a
Control device number: Dust collector C10 (QL-24)
Date of installation: 00/00/86
Description of device: Dust collector QL-24 is SLY PC-102-4 (mfg. & model)

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	99

Pressure drop across the filter (inches of H2O): 0.5-8
Filter medium or type of material: Polyester
Maximum inlet gas flow rate (ACFM): 1000.0
Maximum inlet gas temperature (°F): 75.00
Number of bags: 12
Dimensions of bags/filters: 178 sq. ft.
Air to cloth ratio (acfm/ft²): 5-6:1

8b. STACK INFORMATION
Stack Identification Number: S15b
Exhausting Unit(s): P10b
This stack has an actual exhaust point: Yes
Discharge height above ground level (ft): 14.0
Inside dimensions at outlet (ft): Rectangular- 0.792 by 1.21
Exhaust flow rate (Normal) (ACFM): 3000
Exhaust gas temperature (Normal) (°F): 75
Exhaust gas discharge direction: Up
Stack equipped with any obstruction: No

A. Emission Unit Information
Process number: P10b
Unit description: Bulk Loadout from Quicklime Tank #4 QL-73
Control technology status: Controlled
Date of construction or last modification: 00/00/86
Construction Permit: none

Raw materials	Maximum Usage
Quicklime	20 TPH

Finished products	Maximum produced
Quicklime	20 TPH

Control devices associated with this emissions unit
Emission unit controlled: P10b
Control device number: Dust collector C11 (QL-30)
Date of installation: 00/00/86
Description of device: Dust collector QL-30 is a SLY PC-104-6 (mfg. & model)

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	99

Pressure drop across the filter (inches of H2O):	0.5-8
Filter medium or type of material:	Polyester
Maximum inlet gas flow rate (ACFM):	3000.0
Maximum inlet gas temperature (°F):	75.00
Number of bags:	12
Dimensions of bags/filters:	533 sq. ft
Air to cloth ratio (acfm/ft²):	5-6:1

8c. STACK INFORMATION

Stack Identification Number:	S15c
Exhausting Unit(s):	P10c
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	95.0
Inside dimensions at outlet (ft):	Rectangular - 0.833 by 1.00
Exhaust flow rate (Normal) (ACFM):	3075
Exhaust gas temperature (Normal) (°F):	70
Exhaust gas discharge direction:	Up
Stack equipped with any obstruction:	No

A. Emission Unit Information

Process number:	P10c
Unit description:	Bulk Loadout from Quicklime Tank # QL-73
Control technology status:	Controlled
Date of construction or last modification:	00/00/86
Construction Permit:	none

Raw materials	Maximum Usage
Quicklime	20 TPH

Finished products	Maximum produced
Quicklime	20 TPH

Control devices associated with this emissions unit

Emission unit controlled:	P10c
Control device number:	Dust collector C12 (QL-65)
Date of installation:	00/00/94

Description of device: Dust collector QL-65 is a MAC 96AVS36 (mfg. & model)

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	99

Pressure drop across the filter (inches of H2O):	0.5-8
Filter medium or type of material:	Polyester
Maximum inlet gas flow rate (ACFM):	3075.0
Maximum inlet gas temperature (°F):	75.00
Number of bags:	36
Dimensions of bags/filters:	478 sq. ft.
Air to cloth ratio (acfm/ft²):	6-4:1

9. STACK INFORMATION

Stack Identification Number:	S16
Exhausting Unit(s):	P13
This stack has an actual exhaust point:	No
Discharge height above ground level (ft):	-1.0
Inside dimensions at outlet (ft):	
Exhaust flow rate (Normal) (ACFM):	-1
Exhaust gas temperature (Normal) (°F):	-1
Exhaust gas discharge direction:	
Stack equipped with any obstruction:	

A. Emission Unit Information

Process number:		P13
Unit description:	Conveyors	Material transfer: Hydrate milling section
Control technology status:		Uncontrolled
Date of construction or last modification:		00/00/82
Construction Permit:		none

Raw materials	Maximum Usage
Quicklime	15.000

Finished products	Maximum produced
Milled quicklime	15.000

10. STACK INFORMATION

Stack Identification Number:	S17
Exhausting Unit(s):	P11
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	40.0
Inside dimensions at outlet (ft):	Rectangular - 0.67 by 5.42
Exhaust flow rate (Normal) (ACFM):	1560
Exhaust gas temperature (Normal) (°F):	75
Exhaust gas discharge direction:	Up
Stack equipped with any obstruction:	No

A. Emission Unit Information

Process number:		P11
Unit description:	Conveyors	Dust collectors (QL-46): Hydrate and milling operations
Control technology status:		Controlled
Date of construction or last modification:		00/00/82
Construction Permit:		none

Raw materials	Maximum Usage
Quicklime	15.000

Finished products	Maximum produced
Milled quicklime	15.000

Control devices associated with this emissions unit

Emission unit controlled:	P11
Control device number:	C13
Date of installation:	00/00/82

Description of device: The dust collector QL-46 serves to reduce particulate emissions from iconveying operations between the hammer mill (QL-34) quicklime tank i(QL-59)

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	-1.000

Pressure drop across the filter (inches of H2O):	0.5-8.0
Filter medium or type of material:	Polyester
Maximum inlet gas flow rate (ACFM):	1560.0
Maximum inlet gas temperature (°F):	75.00
Number of bags:	36
Dimensions of bags/filters:	250 sq. ft.
Air to cloth ratio (acfm/ft²):	6.2:1

11. STACK INFORMATION

Stack Identification Number:	S20
Exhausting Unit(s):	P22
This stack has an actual exhaust point:	No
Discharge height above ground level (ft):	-1.0

Inside dimensions at outlet (ft):
Exhaust flow rate (Normal) (ACFM): -1
Exhaust gas temperature (Normal) (°F): -1
Exhaust gas discharge direction:
Stack equipped with any obstruction:

A. Emission Unit Information

Process number: P22
Unit description: Conveyors Material transfer: Hydrate and milling operations
Control technology status: Uncontrolled
Date of construction or last modification: 00/00/54
Construction Permit: none

Raw materials	Maximum Usage
Hydrated lime	20 TPH

Finished products	Maximum produced
Hydrated lime	20 TPH

12. STACK INFORMATION

Stack Identification Number: S21
Exhausting Unit(s): P20
This stack has an actual exhaust point: Yes
Discharge height above ground level (ft): 50.0
Inside dimensions at outlet (ft): Rectangular - 0.50 by 0.25
Exhaust flow rate (Normal) (ACFM): 1120
Exhaust gas temperature (Normal) (°F): 75
Exhaust gas discharge direction: Up
Stack equipped with any obstruction: No

A. Emission Unit Information

Process number: P20
Unit description: Conveyors, Dust collector (HL-1) for hydrated lime tanks (HL-7, HL-8)
Control technology status: Controlled
Date of construction or last modification: 00/00/54
Construction Permit: none

Raw materials	Maximum Usage
Hydrated lime	20.000

Finished products	Maximum produced
Hydrated lime	20.000

Control devices associated with this emissions unit
Emission unit controlled: P20
Control device number: C21
Date of installation: 07/86
Description of device: The dust collector serves to reduce particulate emissions from iconveying operations to hydrated lime tanks (HL-7 and HL-8)

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	-1.000

Pressure drop across the filter (inches of H2O): 0.5-8.0
Filter medium or type of material: Polyester
Maximum inlet gas flow rate (ACFM): 1120.0
Maximum inlet gas temperature (°F): 75.00
Number of bags: 36
Dimensions of bags/filters: 125 sq. ft.
Air to cloth ratio (acfm/ft²): 8.9:1

13. STACK INFORMATION

Stack Identification Number: S22
Exhausting Unit(s): P23
This stack has an actual exhaust point: No
Discharge height above ground level (ft): -1.0
Inside dimensions at outlet (ft):
Exhaust flow rate (Normal) (ACFM): -1
Exhaust gas temperature (Normal) (°F): -1
Exhaust gas discharge direction:
Stack equipped with any obstruction:

A. Emission Unit Information

Process number: P23
Unit description: Loading operations — Bulk loading: Hydrated lime bagging sections
Control technology status: Uncontrolled
Date of construction or last modification: 00/00/54
Construction Permit: none

Raw materials	Maximum Usage
Hydrated lime	55.000

Finished products	Maximum produced
Hydrated lime	55.000

14. STACK INFORMATION

Stack Identification Number: S23
Exhausting Unit(s): P21
This stack has an actual exhaust point: Yes
Discharge height above ground level (ft): 31.0
Inside dimensions at outlet (ft): Rectangular - 10.50 by 9.38
Exhaust flow rate (Normal) (ACFM): 3306
Exhaust gas temperature (Normal) (°F): 75
Exhaust gas discharge direction: Up
Stack equipped with any obstruction: No

A. Emission Unit Information

Process number: P21
Unit description: Loading — Dust collectors (BL-17 and BL-68): Hydrate lime bagging operations
Control technology status: Controlled
Date of construction or last modification: 00/00/54
Construction Permit: none

Raw materials	Maximum Usage
Hydrated lime	55.000

Finished products	Maximum produced
Hydrated lime	55.000

Control devices associated with this emissions unit
Emission unit controlled: P21
Control device number: C22
Date of installation: 00/00/74
Description of device: The dust collector BL-17 serves to reduce particulate emissions from ibagging operations (baggers BL-22 and BL-20)

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	-1.000

Pressure drop across the filter (inches of H2O): 0.5-8.0
Filter medium or type of material: Polyester
Maximum inlet gas flow rate (ACFM): 4212.0
Maximum inlet gas temperature (°F): 75.00
Number of bags: 42

Dimensions of bags/filters:	703 sq. ft.
Air to cloth ratio (acfm/ft²):	6.0:1
Control devices associated with this emissions unit	
Emission unit controlled:	P21
Control device number:	C23
Date of installation:	00/00/85

Description of device: The dust collector BL-17 serves to reduce particulate emissions from ibulk loading operations [BL-73]

Pollutant(s) controlled	Efficiency (%)
Particulate matter emissions	-1.000

Pressure drop across the filter (inches of H2O):	0.5-8.0
Filter medium or type of material:	Polyester
Maximum inlet gas flow rate (ACFM):	2400.0
Maximum inlet gas temperature (°F):	75.00
Number of bags:	60
Dimensions of bags/filters:	345 sq. ft.
Air to cloth ratio (acfm/ft²):	7.0:1

15. STACK INFORMATION

Stack Identification Number:	S24
Exhausting Unit(s):	P24
This stack has an actual exhaust point:	No
Discharge height above ground level (ft):	-1.0
Inside dimensions at outlet (ft):	
Exhaust flow rate (Normal) (ACFM):	-1
Exhaust gas temperature (Normal) (°F):	-1
Exhaust gas discharge direction:	
Stack equipped with any obstruction:	

A. Emission Unit Information

Process number:	P24
Unit description:	Vehicular traffic on unpaved roads
Control technology status:	Uncontrolled
Date of construction or last modification:	00/00/52
Construction Permit:	none

Raw materials	Maximum Usage
Vehicles	12300.000

Finished products	Maximum produced
Vehicles	12300.000

INSIGNIFICANT EMISSION UNITS

Maintenance of Grounds, Equipment, and Bldgs
Purging of Natural Gas Lines
Boiler, Turbine, and HVAC System Maintenance
Pollution Control Equipment Maintenance
Int Comb Eng Used for Warehouse and Mat Trans
Fire Control Equipment
Janitorial Services
Office Activities
Convenience Water Heating
Convenience Space Heating (< 5 mil BTU/hr)
Sanitary Sewer and Plumbing Venting
Kiln Dust System
Storage Piles
Fuel Storage Tanks (Gasoline & Diesel Fuel)

Non-Proc Related Veh Traffic on Unpaved Roads
Vehicle Traffic on Paved Roads

CROSS MEDIA IMPACTS

Holding pen waste is discharged to the quarry.

2 pipes drain on north side of kiln control building.

SOURCE SPECIFIC EMISSION LIMIT CALCULATIONS

Rockwell Lime Company produces dolomitic lime and hydrate commercially. Lime is produced with 2 rotary kilns. Hydrate is produced from lime with one of two hydrators. The plant produces its own kiln feed from a contiguous dolomitic limestone quarry. Limestone is blasted from the quarry and crushed and screened in the quarry pit. It is then conveyed up to the adjacent plant.

Two rotary lime kilns manufacture quicklime from the quarried stone. The kilns have a combined heat input rating of 129 MMBTU/hr. The kilns run 24 hours/day, and as many days as possible per year. In 1998 there were 31 days of downtime and 6 startups. When a kiln is down it requires 24 hours to achieve normal production after the initial startup

About 15 percent of all quicklime produced is converted to hydrated (slaked) lime. There are 2 hydrators at this facility: atmospheric and pressure. The atmospheric hydrator produces a type N hydrate. The pressure hydrator produces a more completely hydrated, type S hydrate.

DISCUSS DECISION TO JOIN QUARRY AND PLANT INTO ONE PERMIT.

UNPAVED ROADS AT THE PLANT

The 1995 application lists 12,300 vehicle miles traveled (VMT) as a maximum at the plant. All VMT generates emissions of particulate matter (dust). The dust generated around the plant site is estimated using the equation,

$E = k(5.9)\ (s/12)\ (S/30)\ (W/3)^{0.7}\ (w/4)^{0.5}\ [(365-p)/365]$ (pounds / VMT) source: AP-42 section 13.2.2.2.

where: E = emission factor (pound particulate matter emitted / VMT)
k = particle size multiplier (dimensonless)
s = silt content of road surface material (%)
S = mean vehicle speed (mph)
W = mean vehicle weight (ton)
w = mean number of wheels
p = number of days with at least 0.01 inches of preciptation per year.

$E = \mathbf{0.5}(5.9)\ (\mathbf{10}/12)\ (\mathbf{5}/30)\ (\mathbf{22}/3)^{0.7}\ (\mathbf{6}/4)^{0.5}\ [(365-\mathbf{120})/365]$ (pounds / VMT) -- variables are in bold.

E = 1.4 pounds particulate matter / VMT.

Truck traffic is modelled at 2 points at the plant: 1) trucks using the haul road from the plant to the quarry are assumed to represent 50% of plant VMT; 2) trucks driving around the plant are assumed to represent the other 50%. The application lists the normal operating schedule as 8 hours/day 5 day/wk 260 day/yr. Therefore the PTE of particulate matter from unpaved roads at the plant is:

PM PTE around plant = 12,300 VMT x 0.5 x 1.4 pounds / VMT = 8,610 lb/year ÷ 2080 hr/year = 4.1 lb/hr;
PM PTE haul road to the quarry = 12,300 VMT x 0.5 x 1.4 pounds / VMT = 8,610 lb/year ÷ 2080 hr/year = 4.1 lb/hr.

Emissions from unpaved roads in the quarry are included under quarry emissions.

QUARRYING EMISSIONS

Emissions from the quarry operation are estimated based on supplemental information provided by Rockwell Lime 4/22/98. The quarry operation produces more than 300,000 tons limestone per year. The limiting processing rate is the primary jar crusher @ 310 tons per hour limestone. Modelling of quarry sources is done by combining numerous sources into 3 artificial ones: PQ1, PQ2 and PQ3.

Source PQ1 consists of emissions from rock drilling, blasting, loading and hauling from the quarry working face to the primary crusher. Loading and hauling start at level #3, elevation 595 feet. Hauling trucks drive up to the crusher plant at level #1, elevation 645 feet. For modelling, the 'stack' height for PQ1 is set at 75 feet below the lime plant elevation of 695 feet. This is also referred to as quarry level #2, elevation 620 feet.

Particulate Emissions From PQ1
MTE PM = (0.03 drilling + 0.41 blasting + 1.92 loading + 411.58 hauling)TPY x 2000 lb/ton ÷ 8760 hr/year = 94 lb/hr
PTE PM @ 50% control = (0.44 + 413.5 x 0.5)TPY x 2000 lb/ton ÷ 8760 hr/year = 47 lb/hr
PTE PM @ 75% control = (0.44 + 413.5 x 0.25)TPY x 2000 lb/ton ÷ 8760 hr/year = 24 lb/hr

MTE PM10 = (0.03 drilling + 0.41 blasting + 0.91 loading + 148.17 hauling)TPY x 2000 lb/ton ÷ 8760 hr/year = 34 lb/hr
PTE PM10 @ 50% control = (0.44 + 149.08 x 0.5)TPY x 2000 lb/ton ÷ 8760 hr/year = 17 lb/hr
PTE PM10 @ 75% control = (0.44 + 149.08 x 0.25)TPY x 2000 lb/ton ÷ 8760 hr/year = 9 lb/hr

Other Emissions Of PQ1 From Rock Drilling and Blasting
MTE = PTE of carbon monoxide = 40.8 TPY x 2000 lb/ton ÷ 8760 hr/year = 9.3 lb/hr
MTE = PTE of nitrogen oxides = 16.73 TPY x 2000 lb/ton ÷ 8760 hr/year = 3.8 lb/hr
MTE = PTE of sulfur dioxide = 1.48 TPY x 2000 lb/ton ÷ 8760 hr/year = 0.34 lb/hr
MTE = PTE of hydrogen sulfide = 0.12 TPY x 2000 lb/ton ÷ 8760 hr/year = 0.03 lb/hr

At level #1 inside the quarry, the limestone crusher plant sources are also aggregated, as source PQ2. Twenty three quarry sources having particulate matter emissions are modelled as PQ2. They are located in the northeast corner of the quarry. PQ2 is modeled in the middle of the cluster of the crushing plant, 125 feet southwest of the lime plant. The 'stack' height for PQ2 is set at 30 feet below the lime plant elevation of 695 feet.

Particulate Emissions From PQ2
MTE PM = (881.59 crushing/screening sources + 583.83 conveyor sources)TPY x 2000 lb/ton ÷ 8760 hr/year = 94 lb/hr
PTE PM @ 50% control = (1465 x 0.5)TPY x 2000 lb/ton ÷ 8760 hr/year = 170 lb/hr
PTE PM @ 75% control = (1465 x 0.25)TPY x 2000 lb/ton ÷ 8760 hr/year = 84 lb/hr

MTE PM10 = (169.2 crushing/screening sources + 31.62 conveyor sources)TPY x 2000 lb/ton ÷ 8760 hr/year = 94 lb/hr
PTE PM10 @ 50% control = (200 x 0.5)TPY x 2000 lb/ton ÷ 8760 hr/year = 23 lb/hr
PTE PM10 @ 75% control = (200 x 0.25)TPY x 2000 lb/ton ÷ 8760 hr/year = 11 lb/hr

Source PQ3 consists of several ash storage piles from the lime kilns baghouse. Dump trucks drop the piles on quarry level #1, elevation 645 feet. For modelling, the 'stack' height for PQ3 is set at 40 feet below the lime plant elevation of 695 feet.

The application append. B table 4-12 states the maximum truck loading rate at the baghouse is 3 ton ash per hour, and that 10.6% of the particulate is calcium oxide (CaO). The percent nickel is estimated as 0.4% in this review. The ash dropped has the consistency of flour. Since the are no emission factors for stockpiling under the lime manufacturing sections of AP-42, a particulate emission factor of 0.0074 lb/ton (SCC 30502007) is used for PM and PM10. This factor presented in the 1998 WDNR Nonmetallic Mining guidance for PM emissions from quarry stone stockpiles, fed by unloading trucks, at 50% control. However, since this material is finer than stone, 50% control is not assumed, i.e. the emission factor is multiplied by a factor of 2. No emissions are estimated from stockpile wind erosion because I have not observed visible emissions from the piles.

Emissions From PQ3
MTE = PTE of PM and PM10 = 3 TPH x 0.0074 lb/ton ash unloaded from open truck x 2 = 0.0444 = 0.04 lb/hr
MTE = PTE of CaO = 0.0444 lb/hr x 0.106 = 0.005 lb/hr
MTE = PTE of nickel = 0.0444 lb/hr x 0.004 = 0.0002 lb/hr x 8760 hr/year = 2 lb/yr.

STACK S11, PROCESS P33 and P36 TWO LIME KILNS

The crusher and screens deliver 1/4-inch and 2 1/2-inch fragments to the two rotary lime kilns. When the feed size range is narrow and the minimum size is above 1/2-inch, a high degree of mixing in the bed during calcination produces a very uniform lime. Approximately 2 tons of feedstone are required to manufacture a ton of lime. Neither kiln is equipped with a stone preheater. Both kilns fire an 80 / 20 mixture of coal / coke with natural gas.

The kilns are installed at about 3° inclination on four foundation piers and revolves on trunnions at 45-75 seconds per revolution. Limestone is fed into the elevated end of the kiln and is discharged as quicklime at the lower end. Cooling air is induced into the discharge end of the product cooler and into the kiln as secondary combustion air. All cooling air is pulled to the fan in front of the baghouse. The combustion gases flow countercurrent to the flow of the stone at the charging end. Emissions from kiln No. 1 and 2 come from the calcination of the feedstone and the combustion of fuel. Leaving the kilns, exhaust is cooled as it passes through a series of M-tubes.

TABLE 2. QUICKLIME PRODUCTION RECORD (TONS)

	Kiln #1 S11 P33		Kiln #2 S11 P36	
	TPY	TPH	TPY	TPH
1998	27,425	3.83	97,234	11.99
1997	26,971	4.16	92,470	12.04
1996	23,588	4.16	85,265	10.28
1995	3,304	3.72	93,671	11.25

TABLE 3. HISTORICAL FUEL USE BY KILN #2 - RATED AT 87.5 MMBtu/hr HEAT INPUT

	COAL/COKE BURNED			NATURAL GAS		TOTAL
	MMBtu/ton	TPH	MMBtu/hr	CF6/hr	MMBtu/hr	MMBtu/hr
4 qtr 1998	26.47	2.44	64.58	0.021	21.28	85.86
3 qtr 1998	26.28	2.36	62.98	0.021	21.58	84.56
2 qtr 1998	26.11	2.46	64.24	0.022	22.24	86.48
1 qtr 1998	25.88	2.44	63.20	0.022	22.18	85.38
4 qtr 1997	26.41	2.46	64.92	0.023	23.53	88.45
3 qtr 1997	26.61	2.43	64.73	0.022	21.92	86.65
2 qtr 1997	26.93	2.31	62.09	0.024	23.83	85.92
1 qtr 1997	26.32	2.40	63.09	0.019	19.19	82.28

HHV coal = 87.5 MMBtu/hr ÷ 3.42 ton coal/hr = 25.6 MMBtu/ton

LIME KILN BAGHOUSE

Lime Kilns No. 1 and 2 exhaust to the same baghouse. It is a Fuller Model #8MP 5900 positive pressure reverse jet. The collector is designed to for 69,107 acfm (450 °F) from the kiln burners and coolers, through both kilns and the M-tubes. Each kiln has its own fan. The baghouse consists of eight modules. In 1980 two modules were added so that exhaust from kiln No. 1 could be handled. All modules operate at the same time. Each module has 112 filter bags, 8" in diameter and 25 feet long. The air to cloth ratio is 1.46 to 1.

Reverse air is used to clean each of the 8 modules in the baghouse. It cleans each compartment every 1.85 hours. One cleaning cycle of the entire baghouse takes 111 minutes, as shown:

cleaning cycle = time when cleaning + time when no cleaning
= [8 x 2.83 minutes/module + 8 x 11 minute pause between modules]
111 minutes = 23 minutes of cleaning + 88 minutes of no cleaning.

The baghouse is equipped with a manometer to measure inlet pressure. A chart recorder is located in the control room to continuously record the pressure. When there is no cleaning occurring a 'base' pressure is recorded. When cleaning is occurring, a 'peak' pressure is recorded. Thus, the pattern recorded is tooth-like, because the needle moves from base to peak and back, as each module is cleaned. At the time of this inspection, the base pressure was 6.0 inches wc, and the peak value was 7.0 inches wc. The base pressure occurred for 12 minutes followed by a peak pressure for 2.8 minutes.

The baghouse passed a stack test on 6/18/99 at a time between cleaning of 25 minutes. However, on 7/8/99 Don Brisch stated that the time between module cleaning is shortened from 25 to 12 minutes, because too thick a filter cake builds up otherwise. I also ~~noted~~ that the operator was recording the baghouse pressure as the peak value.

The baghouse stack is equipped with a continuous opacity monitor. The monitor is also used to help diagnose baghouse malfunctions. RLC stated that when the monitor reads 0 - 4% opacity, the baghouse is considered to operate normally. Over 6% opacity, they start isolating baghouse compartments to determine bag failure locations.

Control for Particulate Matter Emissions

The baghouse reduces emissions of particulate matter (TSP). Testing conducted 11/20/96 measured a TSP emission rate of 0.23 lb/ton limestone. The emission rate was in compliance with the limit of 0.3 lb/ton stone (established as BACT under permit # 93-RV-108). This measured control efficiency is equivalent to a 99.7 percent removal efficiency. Derived by 100 x [(80 - 0.23)/80]lb/ton lime produced. This is slightly less efficient than a TSP emission rate of 0.23 lb/ton lime produced. The uncontrolled TSP emission factor of 80 lb/ton lime produced is taken from AP-42 table 11.17-2 data, for a coal and gas fired rotary kiln. The 1996 measured removal efficiency is slightly less than the 99.83% efficiency used to establish BACT.

A stack test conducted more recently shows baghouse control efficiency has declined. Testing conducted 11/24/98 measured a TSP emission rate of 0.81 lb/ton limestone, and non-compliance with the TSP limit established under permit # 93-RV-108. The control efficiency measured in 1998 is thus estimated at 99.0 %, derived by 100 x [(80 - 0.81)/80]lb/ton lime produced.

TABLE 4. SUMMARY OF PARTICULATE EMISSION RESULTS FROM STACK TESTS ON S11, P36 (LIME KILN #2)

Kiln #2 Stack Test Dates	Particulate Measured			Avg. Stack Gas ACFM $\%O_2$ Temp. %Opacity	Baghouse Inlet Press. **Range and Average** Inches wc	Baghouse Outlet Press. **Range and Average** Inches wc	Baghouse Module Press. Drop **Range and Average** Inches wc	Time Between Cleaning of Each Module (TBC) Minutes & Mod. Off
	lb/hr	lb/ton stone	lb/ton lime produced					
6/18/99	0.52 0.14 *	0.021 0.0058 *	0.042 0.012 *	49,760 7.2 % 422 °F 1%	6.3 - 7.0 Avg=6.8	-0.1 to -0.1 Avg = -0.1	3.9 - 5.5 Avg =4.5	TBC=25 Mod. Off= #2,5,7

5/20-21/99	metals	metals	metals	50,950 7.2% 401 °F NR	6.1 - 6.8 Avg=6.5	0.1 to 0.1 Avg=0.1	3.4 - 5.2 Avg =4.3	TBC=25 Mod. Off = #2,3,8
4/8/99	15.62 9.22 *	0.59 0.35 *	1.18 0.70*	47,628 9.0 % 375 °F 3%	3.9 - 4.0 Avg=4.0	-0.15 to -0.14 Avg = -0.14	1.9 - 3.0 Avg =2.3	TBC=11 Mod.Off = #4
4/7/99	metals	metals	metals	59,097 12.9% 371 °F 4%	4.6 - 5.9 Avg=5.1	-0.18 to -0.16 Avg = -0.17	2.0 - 3.7 Avg =2.7	TBC=11 Mod.Off = none
11/24/98	9.86 4.13 *	0.41 0.17 *	0.81 0.34 *	63,314 14.3% 356 °F	5.4 - 5.6 Avg=5.5	-0.22 to -0.21 Avg = -0.22	2.1 - 2.7 Avg =2.3	TBC=? Mod.Off = none
11/20/96	3.04 0.74 *	0.12 0.03 *	0.23 0.06 *	49,261 8.7% 424 °F 0%	3.4 - 3.4 Avg=3.4	-0.08 to -0.08 Avg = - 0.08	1.2 - 2.9 Avg =2.3	? Mod.Off = none
10/15/92	0.79 *	0.03 *	0.07 *	35,396 8.8% 338 °F				

Notes * = front half only. "Mod. Off" indicates the name of the baghouse modules closed off during the test. NR = not reported.

STACK S11, PROCESS P33 6.25 TPH LIME KILN No. 1 - constructed or last modified in 1952.

Rotary Kiln No. 1 is 6 foot 4 inches in diameter and 150 feet long. It is rated at 44 million BTU per hour heat input. At this rating, fuel consumption is equivalent to 1.72 tons per hour of coal or 1.57 tons per hour of coal/petrocoke blend. This fuel rate enables the kiln to produce 150 tons per day of dolomitic lime at a feedstone rate of approximately 300 tons per day.

New Source Review Applicability

Lime Kiln No. 1 is not subject to New Source Performance Standards (NSPS) and Prevention of Significant Deterioration (PSD) requirements because its installation pre-dates these standards.

Applicable Requirements

Emission Limit for Particulate Matter

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 7.44 lb/hr, that ambient air quality standards are protected. The alternative emission limit is found under NR 415.05(1)(k), it is 0.2 lb/1000 lb gas. The hourly emission rate calculated from this alternative provides E = 19 lb/hr = [37,000 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(450+460) x 60 min/hr]. Thus the emission limit will be _?_ lb/hr. The limit based on 0.3lb/ton stone = 3.75 lb/hr

At all times that kiln #1 is operated, exhaust shall be controlled by at least 2 baghouse modules which are maintained at a pressure drop greater than 3.5 inches of base pressure.

The permittee shall conduct sulfur dioxide emission test on Kiln #1 every 24 months using U.S. EPA Methods 5 and 202. These tests should be conducted within 90 days of the anniversary date of the first performance test. During the stack test the permittee shall also record the opacity (CEM data) and the pressure drop across each module which is operating in the baghouse.

Emission Limits for Sulfur Dioxide

Kiln #1 is subject to the sulfur dioxide emission limitation of 5.5 pounds of sulfur dioxide per million Btu heat input, per NR 417.07(2)(b). This is because it was constructed on or before 2/1/85, and is part of a facility which has a total heat input capacity of less than 250 million Btu per hour on solid fuel. The total heat input capacity of the facility is 131.5 million Btu per hour, which is the rating for coal and coke combustion in the lime kilns. Based on the limit the PTE of sulfur dioxide is,

PTE sulfur dioxide = 5.5 lb SO_2 / MMBtu x 44 MMBtu / hr = 242 lb SO_2 / hour

= 242 lb SO_2 / hr x 8760 hr/year ÷ 2000 lb/ton = 1,060 ton SO_2 / year.

Coke is burned with natural gas in Kiln #1. In 1998, the coke burned ranged in sulfur content from 3.5 to 4.6% by weight. This varys the emission rate of sulfur dioxide, as does the amount of sulfur dioxide removed by the lime in the kiln. Taking both factors into account, the 1998 emission rate was between 2.6 and 4.8 lb SO_2/MMBtu.[1] This is equivalent to an emission rate of 88 to 163 lb SO_2 per hour.

When less than 10,000 tons per year of coke, or coal, or a mixture thereof are burned, the permittee shall comply with the fuel sampling, analysis and reporting requirements of s. NR 439.085(2)(d), Wis. Adm. Code. The permittee shall submit, on a quarterly basis, information on solid fuel quality which is calculated from the supplier's analyses for each shipment of solid fuel received at RLC and burned in Kiln #1. The permittee shall also keep daily records of type and amount of fuel fired. The authority to impose these standards for coke fuel is provided under s. NR 439.085(4), Wis. Adm. Code.

Compliance demonstration with the emission limit is required on a daily basis. To demonstrate compliance a solid fuel maximum sulfur content is imposed. The maximum sulfur content is calculated as follows.

$$5.5 \text{ lb } SO_2 \text{ per MMBtu} = \frac{[\ 1.57 \text{ ton/hr} \times 39(\text{Max. Sulfur Content})\ ] \text{ lb } SO_2/\text{hr} - \text{lb } SO_2/\text{hr removed}}{44 \text{ MMBTU/hr heat input to kiln \#1}}$$

$$5.5 \text{ lb } SO_2 \text{ per MMBtu} = \frac{61.23\ (\text{Max. Sulfur Content})\ (1 - 0.09\ ) \text{lb } SO_2/\text{hr}}{44 \text{ MMBTU/hr}} = \text{Max. Sulfur Content(1.27 lb } SO_2 \text{ per MMBtu)}$$

Max. Sulfur Content = 4.3% by weight.

The calculation assumes
- only coke is burned in the kiln,
- 1.57 ton/hr coke provides the kiln's rated 44 MMBtu/hr heat input,
- and the amount of sulfur dioxide removed by the lime in the kiln is only 9%, the smallest removal ever measured.

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[1] The sulfur dioxide emission estimates are calculated using: 1) an emission factor for coke of 39(S), taken from AP-42 Table 1.2-1 for anthracite coal, 2) as-received data for 1998 for fuel input and sulfur, e.g. the sulfur content of coke at the burner tip varied between 3.5 and 4.6% by weight, and 3) the percent of SO_2 removed by calcination, 9% to 36%, is derived from stack tests at this source (see Table 3).

$$SO_2 \text{ Emission Rate (1998)} = \frac{[\ 1995 \text{ lb coke} \div 2000/\text{hr} \times 39(3.5 \text{ or } 4.6)\ ] \text{ lb } SO_2/\text{hr} - \text{lb } SO_2/\text{hr removed by calcination}}{[\ 1995 \text{ lb coke/hr} \times 14{,}160 \text{ Btu/lb} \times 10\text{-}6\ ] + [0.006 \text{ MMCF natural gas/hr} \times 1014 \text{ MMBTU/MMCF}]}$$

$$= \frac{38.9[3.5 \text{ or } 4.6] \text{ lb } SO_2/\text{hr} - 0.09 \text{ to } 0.36\ [\ 38.9(3.5 \text{ or } 4.6)\ ] \text{ lb } SO_2/\text{hr}}{[\ 28.25 \text{ MMBTU/hr from coke}\ ] + [6.084 \text{ MBTU/hr from natural gas}]}$$

$$= \frac{87 \text{ to } 163 \text{ lb } SO_2}{34 \text{ MMBTU}} = 2.6 \text{ to } 4.8 \text{ lb } SO_2/\text{MMBtu}$$

The permittee shall conduct sulfur dioxide emission test on Kiln #1 every 24 months using U.S. EPA Method 6c. These tests should be conducted within 90 days of the anniversary date of the first performance test.

Emission Limits for Nickel

See

Emission Limits for Opacity

Kiln #1 is subject to the opacity limitation under NR 431.04(2) since it is located in subregion 1 of the Lake Michigan Intrastate AQCR. Therefore the opacity limitation is 20% opacity. It is not subject to the NSPS emission limit for opacity of 15% per sec. NR 440.51(3)(a)2., Wis. Adm. Code, because it was installed and last modified before 1977. When operated with kiln #2, however, it is subject to the 10% opacity limit established as part of the BACT determination for kiln #2 under sec. NR 405.08, Wis. Adm. Code?

Table 4. Stack S11, Unit P33: LIME KILN #1 AT MAXIMUM CAPACITY OF 6.25 TON QUICKLIME PRODUCTION PER HOUR (12.5 TON STONE FEED/HR) AND 1.72 TON/HR COAL/COKE/NATURAL GAS BLEND.						
Pollutant	Emission Factor	Process Weight Rate	Maximum Theoretical		Potential to Emit	
	lb pollutant per ton	ton/hr	lb/hr	TPY	lb/hr	TPY
Carbon monoxide	2.0 lime produced [1]	6.25	12.5	54.75	12.5	54.75
Nitrogen oxides	2.8 lime produced [1]	6.25	17.5	76.65	17.5	76.65
Particulate matter	0.595 lime produced [2]	6.25	500	2190	3.72	16.3
PM10	0.327 lime produced [3]	6.25	275	1205	2.05	8.96
VOC	0.042 lime produced [4]	6.25	0.263	1.15	0.263	1.15
Sulfur dioxide	5.5 lb SO_2 / MMBtu	44 MMBtu/hr	242	1060	242	1060
Sulfuric Acid 7664-93-9 NR 445 only	0.0045(S) fuel blend [10]	1.72 coal	1.34	5.87	0.67	2.94
CaO 1305-78-8 NR 445	0.18 lime produced [6]	6.25	53	232	1.1	4.9
HCl 7647-01-0 NR 445, s.112(b)	0.6 lime produced [7]	6.25	3.8	16	3.8	16
Benzene	$1.3x10^{-3}$ coal/coke burned [8]	1.72	$2.2x10^{-3}$	20lb/year	$2.2x10^{-3}$	20lb/year
Formaldehyde 50-00-0 NR 445, s.112(b)	$2.4x10^{-4}$ coal/coke burned [8]	1.72	$4.1x10^{-4}$	4 lb/year	$4.1x10^{-4}$	4lb/year
2,3,7,8-TCDD 7647-01-0 NR 445 ,s.112(b)	$1.2x10^{-10}$ lime produced [9]	6.25	$0.8x\ 10^{-9}$	0.00001 lb/year	$0.8x\ 10^{-9}$	0.00001 lb/year
Arsenic 7440-38-2 NR 445, s.112(b)	0.004 coal burned, CE=99% [10]	1.72	0.007	0.04	0.00007	0.0003
Barium 7440-39-3* NR 445, s.112(b)	$1.71x10^{-5}$ stone feed, CE= 50% [11]	12.5	0.0002	0.0009	0.0001	0.0005
Beryllium 7440-41-7* NR 445, s.112(b)	$9.84x10^{-5}$ stone feed, CE=99% [11]	12.5	0.001	0.005	0.00001	0.00005
Cadmium 7440-43-9* NR 445, s.112(b)	0.006 coal burned, CE=99% [10]	1.72	0.01	0.045	0.0001	0.0005
Chromium VI 7440-47-3* NR 445, s.112(b)	0.0005 coal burned, CE=0% [10]	1.72	0.0009	0.0038	0.0009	0.0038
Total Chromium 7440-47-3 NR 445, s.112(b)	0.1 coal burned, CE=95% [10]	1.72	0.17	0.75	0.009	0.038
Lead 7439-92-1* s.112(b) only	$1.13\ x10^{-3}$ stone feed, CE=96% [11]	12.5	0.014	0.062	0.0006	0.0025
Manganese 7439-96-5* NR 445, s.112(b)	$1.27\ x10^{-3}$, CE=80% [11]	12.5	0.016	0.069	0.0032	0.014
Mercury 7439-97-6* NR 445, s.112(b)	0.0001 coal burned, CE=50% [10]	1.72	0.0002	0.0008	0.0001	0.0004
Nickel 7440-02-0* NR 445, s.112(b)	$3.93x10^{-1}$ stone feed, CE=96% [11]	12.5	4.9	21	0.20	0.86
Selenium 7782-49-2 * NR 445, s.112(b)	$3.64x10^{-4}$ lime produced, CE=90% [10]	6.25	0.002	0.01	0.0002	0.001
Total Metal HAPs s.112(b) only					1.8	7.8

Notes to Table 4.

" * " = may be multiple cas #, cas # used is for the metal.
Emission rate = process rate x emission factor x 8760 hrs/yr x ton/2000 lbs

(1) Based on AP-42 Table 11.17-6 uncontrolled CO and NOx emission factors for rotary lime kilns and permit # 93-RV-108.
(2) Based on controlled PM emissions factor from permit # 93-RV-108.

■ (3) Based on TSP emissions factor and AP-42 Table 11.17-7, particle size distribution for a lime kiln with a fabric filter baghouse. The table shows 55% by weight of TSP is less than 10 micron particle size.
■ (4) Based on stack test at APG Lime Company kiln baghouse outlet, reviewed in USEPA memorandum to Joe Wood dated 4/2/97.

■ (6) Based on emission factor of 10.6 lb CaO emitted per 100 lb TSP from Appendix B Title 5 Application, and 99.7% control, e.g. controlled emission factor = 0.106 lb CaO/lb TSP x 80 lb TSP/ton limestone x 0.0017 = 0.18 lb/ton limestone produced.
■ (7) Based on Rockwell Lime stack test for HCl, measured after baghouse 10/15/92 @ 7 lb/hr.
■ (8) Based on AP-42 Table 1.1-13 controlled benzene and formaldehyde emission factors for coal combustion.
■ (9) The emission factor is developed from one for Total polychlorinated dibenzo-p-dioxins (CDD) and chlorinated dibenzofurans (CDF) from a rotary lime kiln. This factor is based on a stack test at APG Lime Company kiln baghouse outlet, reviewed in USEPA memorandum to Joe Wood dated 4/2/97. The Total CDD/CDF emission factor is weighted by the ratio of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) to Total CDD/CDF present in AP-42 Table 1.1-11 emission factors for coal combustion, e.g. $1.5x10^{-8}$ lime produced x ratio of [$1.43x10^{-11}$ lb 2,3,7,8-TCDD/ton coal ÷ $1.76x10^{-09}$ lb TCDD/CDF/ton coal] = $1.5x10^{-8}$ x 0.008125 = $1.2 x10^{-10}$ lb 2,3,7,8-TCDD/ton lime produced.
■ (10) Uses the highest emission rate that is derived from 1) the emission factors in Appendix E of the Application, or 2) emission factors from a stack test at APG Lime Co. kiln baghouse outlet, reviewed in USEPA memorandum to Joe Wood dated 4/2/97. Control efficiencies (CE) for metals are used from the latter reference, and vary by metal: Ar = 99%, Cd = 90%, Total Cr = 95%, Hg = 50%, Se = 90%.
■ (11) Metal Emission Factors Developed From Method 29 Testing On Stack S11 With Lime Kiln #2 Operating Only

TABLE 5. SUMMARY OF METAL EMISSION FACTORS FROM STACK TESTS ON S11, P36 (LIME KILN #2)

Metal Tested	EMT Stack Test 4/7/99 Lb/ton stone	CAE Stack Test 5/20-21/99 Lb/ton stone
Barium	$5.86 x10^{-5}$	$9.85 x10^{-6}$
Beryllium	$1.74 x10^{-6}$	$2.28 x10^{-7}$
Lead	$8.42 x10^{-5}$	$6.53 x10^{-6}$
Manganese	$5.01 x10^{-4}$	$5.99 x10^{-6}$
Nickel	$3.14 x10^{-2}$	$9.54 x10^{-6}$
Stack Opacity During Test Baghouse Module Pressure Drop	4% 2.7 inches wc	opacity not reported 4.3 inches wc

STACK S11, PROCESS P36 12.5 TPH LIME KILN No. 2 - constructed or last modified in 1980.

Rotary Kiln No. 2 is 8 feet in diameter and 225 feet long. It is rated at 87.5 million BTU per hour. At this rating fuel consumption is equivalent to 3.42 tons per hour of coal blend. This fuel rate, in turn, enables Kiln No. 2 to produce 300 tons per day of dolomitic lime at a feedstone rate of approximately 600 tons per day.

New Source Review Applicability

This source is subject to New Source Performance Standards (NSPS) and Prevention of Significant Deterioration (PSD) requirements.

A federal and state construction permits were issued in 1978 and 1979, authorizing the construction of kiln #2. Federal permit #EPA-5-A-79 was issued September 27, 1979. The permit established BACT for the kiln as a baghouse, and maximum sulfur content of 2.1% when 1% sulfur coal was not available. EPA permit # EPA-5-A-79 established BACT to be the following:
-Emissions of particulate matter from the baghouse not to exceed 0.30 lbs per ton of stone feed (NSPS emission limit is 0.60 lb/ton)
-Sulfur content of the coal used to fire the kiln not exceed 2.1% on a 24-hr basis
-The exhaust gases from the baghouse not to exceed 10% opacity (NSPS limit is 15%)
-Fugitive particulate matter emissions not to exceed 5% opacity from any of the following sources:

-limestone conveying and storage
-coal unloading and conveying
-lime conveying and storage

On February 7, 1995, operation permits # NS-78-36-61 and EPA-5-A-79 were revised and superceded by permit #93-RV-108. The revisions allow use of a fuel blend with a maximum sulfur content of 2.1% and establishes a SO_2 limit of 5.5 lb/MMBtu. The revision did not constitute a modification because there was no net increase in emissions from the use of different fuels. U.S. EPA agreed by sending a letter to the source indicating that they were considered in compliance with the 2.1% fuel sulfur content with fuel blending.

Applicable Requirements

Emission Limit for Particulate Matter

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 7.44 lb/hr, that ambient air quality standards are protected. The particulate equations provide less restrictive limits. The emission limit using the equation of 415.05(2) provides E = 13.6 lb/hr = $3.59(7.75 \text{ tph})^{0.62}$. The emission limit calculated under 415.05(1)(m) provides E = 11.7 lb/hr = [14,800 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(140+460) x 60 min/hr]. 0.30 #/ton stone feed and BACT sec. NR 405.08, Wis. Adm. Code Thus the emission limit will be 7.44 lb/hr.

BACT has been determined to be the use of a baghouse to control particulate emissions from the lime kiln No. 2.

The permittee shall conduct particulate emission test on lime kiln No. 2 every 24 months using U.S. EPA Method 5. These tests should be conducted within 90 days of the anniversary date of the first performance test, October 15. During the stack test the permittee shall also record the opacity (CEM data) and the pressure drop across each module which is operating in the baghouse.

Emission Limits for Sulfur Dioxide

Permit # 93-RV-108 states that BACT for sulfur dioxide (SO_2) is use of a fuel blend (coal, coke and natural gas) having a sulfur content of 2.1% sulfur on a 24-hour basis. The permit then establishes an equation to derive and limit the mass input of sulfur from natural gas and solid fuel, for RLC to demonstrate compliance with BACT. The equivalent limit for a fuel blend is less than 147 lb sulfur input per hr. The permit assumed that there was 50% sulfur removal, based on RLC's claim at the time. The permit also subjects Kiln #2 to s. NR 417.07(2)(b) which provides 5.5 lb SO_2/MMBtu - 3 hr avg.

sec. NR 405.08, Wis. Adm. CodeBACT BACT has been determined to be the use of fuel blend (natural gas, coal, coke) having a sulfur content of 2.1 percent, as determined by a 24-hour average.The facility will also be required to show compliance with the BACT emissions limit for SO_2 (use of fuel blend having a sulfur content of 2.1% on a 24-hr basis). The facility will be required to sample and analyze the fuel blend on a daily basis and record the amount of each fuel fired on a daily basis.

sec. NR 405.08, Wis. Adm. CodeBACT BACT has been determined to be the use of fuel blend (natural gas, coal, coke) having a sulfur content of 2.1 percent, as determined by a 24-hour average.The facility will also be required to show compliance with the BACT emissions limit for SO_2 (use of fuel blend having a sulfur content of 2.1% on a 24-hr basis). The facility will be required to sample and analyze the fuel blend on a daily basis and record the amount of each fuel fired on a daily basis.

The permittee shall comply with the fuel sampling, analysis and reporting requirements per sec. NR 439.085, Wis. Adm. Code. The permittee shall sample and analyze the fuel blend (coke, coal and natural gas) fired in the kiln No. 2 on a daily basis. The permittee shall also keep daily records of type and amount of fuel fired in Kiln No. 2. A copy of sec. NR 439.085, Wis. Adm. Code requirement enclosed.

These records shall be kept for a period of 5 years and be made available for inspection to the Department staff anytime during normal business hours. All required reports under sec. NR 439.085 shall be submitted to the Department's Lake Michigan District Air Program. This condition is included to demonstrate compliance with the BACT limit of 2.1 percent sulfur. (secs. NR 405.08, NR 439.04, Wis. Adm. Code)

The permittee shall conduct sulfur dioxide emission test on lime kiln No. 2 every 24 months using U.S. EPA Method 6. These tests should be conducted within 90 days of the anniversary date of the first performance test, October 15.

Emission Limits for Nickel

This section provides the rational for, and defines Best Available Control Technology (BACT) for nickel. BACT is required under s. NR 445.05(3)(b), Wis. Adm. Code. It requires that when all sources, combined, exceed the NR 445 Table 3 value for nickel (250 lb/yr), each source must be operated with BACT. BACT has been proposed by RLC and is described below. The facility emission rate of nickel appears to have exceeded 250 lb/yr in each of the years since 1995. The 1998 nickel emissions, before reductions with BACT, are itemized as follows.

Nickel Emission Rate Before BACT

Stack S11, Lime Kilns BH C01 = 3.14 $x10^{-2}$ lb nickel/ton stone x 124,659 TPY quicklime/yr x 2 ton stone/ton QL = 7,800 lb/yr
Stack SD21, C21 ash transfer = 3 TPH x 2.2 lb/ton ash conveyed x 0.004 = 0.026 lb/hr x 8760 hr/yr = 230
Stack SD25, ash loading to open truck = 3 TPH x 1.5 lb/ton ash loaded x 0.004 = 0.018 lb/hr x 8760 hr/yr = 160
Total = 8,200 lb/yr.

Nickel is expected to be controlled by the lime kiln baghouse when good particulate control is achieved. RLC has proposed that BACT for nickel is an increased pressure drop across the baghouse modules. Two stack tests showed that this improves nickel removal by the baghouse. Maintaining an increase in baghouse pressure drop is a reasonable proposal for BACT, since the baghouse manufacturer states that good particulate control is expected at a pressure drop of greater than 3.5 inches across each module. Two stack tests show a significant decrease in nickel emissions when the module pressure drop is increased from 2.7 to 4.3 inches wc.[2]

Nickel Emission Rate After BACT

Stack S11, Lime Kilns BH C01 = 9.54 $x10^{-6}$ lb nickel/ton stone x 124,659 TPY quicklime/yr x 2 ton stone/ton QL = 2 lb/yr
Stack SD21, C21 ash transfer with BH= 3 TPH x 2.2 lb/ton ash conveyed x 0.004 x (1-0.98) = 0.0005 lb/hr x 8760 hr/yr = 5
Stack SD25, ash loading to open truck with shroud = 3 TPH x 1.5 lb/ton x 0.004 x (1-0.70) = 0.0054 lb/hr x 8760 hr/yr = 47
Total = 54 lb/yr.

More On BACT

Emission Limits for Opacity

The NSPS emission limit for opacity is 15% per sec. NR 440.51(3)(a)2., Wis. Adm. Code. 10% opacity limit from the baghouse stack was established as part of the BACT determination under sec. NR 405.08, Wis. Adm. Code. Also 5% opacity limit for limestone

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[2] Operating Parameters During Nickel Stack Tests

Test 1 EMT Stack Test 4/7/99. During the test on Kiln #2, the Δ p across the 8 modules = 2.0 - 3.7 inches wc, avg. = 2.7 inches wc, 4% stack opacity, nickel emission rate = 3.14 $x10^{-2}$ lb/ton stone.

Test 2 CAE Stack Test 5/19-21/99. During test on Kiln #2, the Δ p across the 6 modules used = 2.0 - 3.7 inches wc, avg. = 4.3 inches wc, 1% stack opacity, nickel emission rate = 9.54 $x10^{-6}$ lb/ton stone.

conveying and storage, coal unloading and conveying, lime conveying and storage was established as part of the BACT determination under sec. NR 405.08, Wis. Adm. Code.The permittee shall install, certify, calibrate, maintain and operate a CEM for opacity per sec. NR 440.51(4), Wis. Adm. Code.

Lime fines collected are bagged and used for agricultural lime and acid neutralization. The facility has the capability to monitor pressure drop across each module (when the module is operating) but not across the whole baghouse. The facility also has a CEM on the baghouse stack and provides quarterly CEM reports to the Department. This permit will include a condition which will require the source to monitor pressure drop range across each module (when the lime kiln No. 2 is operating and the module is operating) and record the pressure drop range once each day. To monitor the pressure drop range across the baghouse will not be required because the facility is monitoring the opacity and submitting quarterly reports.

The permittee shall monitor visible emissions from limestone conveying and storage, coal unloading and conveying, lime conveying and storage at least once per day of operation by using a certified visible emissions observer who will perform 3 Reference U.S. EPA Method 9 tests and record the results. Visible emissions observation shall occur during the normal operation of the rotary line kiln No. 2 at least once per day. Records shall be maintained of any 6-minute average that is in excess of 5% opacity. Reports of excess emissions shall be submitted semiannually to the Department's Lake Michigan District Air Program. (sec. NR 407.09(1)(c)1.b., Wis. Adm. Code)
The opacity monitor, reading daily visible emissions for fugitive sources, the biannual stack test results and the pressure drop range information across each module will be used as a tool to determine whether the source is in compliance with the particulate and visible emission limitations.

Emissions Estimate

Emissions from Kilns No. 1 and 2 come from the calcination of the feedstone and the combustion of fuel. Kiln No. 1 is equipped with a baghouse to reduce its particulate emissions during the operation. The removal efficiency of particulate matter in this baghouse is 99.83 percent.

Table 5. Stack S11, Unit P36: LIME KILN #2 AT MAXIMUM CAPACITY OF 12.5 TON QUICKLIME PRODUCTION PER HOUR (25.0 TON STONE FEED/HR) AND 3.42 TON/HR COAL/COKE/NATURAL GAS BLEND.

Pollutant	Emission Factor	Process Weight Rate	Maximum Theoretical		Potential to Emit	
	lb pollutant per ton	ton/hr	lb/hr	TPY	lb/hr	TPY
Carbon monoxide	2.0 lime produced [1]	12.5	25.0	109.50	25.0	109.50
Nitrogen oxides	2.8 lime produced [1]	12.5	35.0	153.3	35.0	153.3
Particulate matter	0.595 lime produced [2]	12.5	1000	4380	7.44	32.58
PM10	0.327 lime produced [3]	12.5	550	2409	4.09	17.92
VOC	0.042 lime produced [4]	12.5	0.525	2.30	0.525	2.30
Sulfur dioxide	2.1 wt. % S, 39(S) fuel blend [5]	3.54 coal	289.92	1,270	144.96	633.35
Sulfuric Acid 7664-93-9 NR 445 only	0.0045(S) fuel blend [10]	3.42 coal	5.87	11.74	1.3	5.87
CaO 1305-78-8 NR 445	0.18 lime produced [6]	12.5	106	466	2.3	10
HCl 7647-01-0 NR 445, s.112(b)	0.6 lime produced [7]	12.5	7.5	33	7.5	33
Benzene	$1.3x10^{-3}$ coal/coke burned [8]	3.42	$4.4x10^{-3}$	39lb/year	$4.4x10^{-3}$	39lb/year
Formaldehyde 50-00-0 NR 445, s.112(b)	$2.4x10^{-4}$ coal/coke burned [8]	3.42	$8.2x10^{-4}$	7 lb/year	$8.2x10^{-4}$	7lb/year
2,3,7,8-TCDD 7647-01-0 NR 445 ,s.112(b)	$1.2x10^{-10}$ lime produced [9]	12.5	$1.5x\ 10^{-9}$	0.00001 lb/year	$1.5x\ 10^{-9}$	0.00001 lb/year
Arsenic 7440-38-2 NR 445, s.112(b)	0.004 coal burned, CE=99% [10]	3.42	0.014	0.06	0.00014	0.0006
Barium 7440-39-3* NR 445, s.112(b)	$1.71x10^{-5}$ stone feed, CE= 50% [11]	25.0	0.0004	0.0019	0.0002	0.0009
Beryllium 7440-41-7* NR 445, s.112(b)	$9.84x10^{-5}$ stone feed, CE=99% [11]	25.0	0.0025	0.011	0.00002	0.0001
Cadmium 7440-43-9* NR 445, s.112(b)	0.006 coal burned, CE=99% [10]	3.42	0.02	0.090	0.0002	0.0009
Chromium VI 7440-47-3* NR 445, s.112(b)	0.0005 coal burned, CE=0% [10]	3.42	0.0017	0.0075	0.0017	0.0075
Total Chromium 7440-47-3 NR 445, s.112(b)	0.1 coal burned, CE=95% [10]	3.42	0.34	1.5	0.017	0.075
Lead 7439-92-1* s.112(b) only	$1.13x10^{-3}$ stone feed, CE=96% [11]	25.0	0.028	0.12	0.0011	0.005
Manganese 7439-96-5* NR 445, s.112(b)	$1.27x10^{-3}$ stone feed, CE=80% [11]	25.0	0.032	0.14	0.0063	0.028
Mercury 7439-97-6* NR 445, s.112(b)	0.0001 coal burned, CE=50% [10]	3.42	0.0003	0.001	0.0001	0.0006
Nickel 7440-02-0* NR 445, s.112(b)	$3.93x10^{-1}$ stone feed, CE=96% [11]	25.0	9.82	43.0	0.39	1.72
Selenium 7782-49-2 * NR 445, s.112(b)	$3.64x10^{-4}$ lime produced, CE=90% [10]	12.5	0.0046	0.02	0.0005	0.002
Total Metal HAPs s.112(b) only					3.5	15

Notes to Table 5.

" * " = may be multiple cas #, cas # used is for the metal.
Emission rate = process rate x emission factor x 8760 hrs/yr x ton/2000 lbs

(1) Based on AP-42 Table 11.17-6 uncontrolled CO and NOx emission factors for rotary lime kilns and permit # 93-RV-108.

■ (2) Based on controlled PM emissions factor from permit # 93-RV-108.
■ (3) Based on TSP emissions factor and AP-42 Table 11.17-7, particle size distribution for a lime kiln with a fabric filter baghouse. The table shows 55% by weight of TSP is less than 10 micron particle size.
■ (4) Based on stack test at APG Lime Company kiln baghouse outlet, reviewed in USEPA memorandum to Joe Wood dated 4/2/97.
■ (5) Based on the PTE established under permit # 93-RV-108 using 2.1 % sulfur content with coal as the only fuel comprising the blend.
■ (6) Based on emission factor of 10.6 lb CaO emitted per 100 lb TSP from Appendix B Title 5 Application, and 99.7% control, e.g. controlled emission factor = 0.106 lb CaO/lb TSP x 80 lb TSP/ton limestone x 0.0017 = 0.18 lb/ton limestone produced.
■ (7) Based on Rockwell Lime stack test for HCl, measured after baghouse 10/15/92 @ 7 lb/hr.
■ (8) Based on AP-42 Table 1.1-13 controlled benzene and formaldehyde emission factors for coal combustion.
■ (9) The emission factor is developed from one for Total polychlorinated dibenzo-p-dioxins (CDD) and chlorinated dibenzofurans (CDF) from a rotary lime kiln. This factor is based on a stack test at APG Lime Company kiln baghouse outlet, reviewed in USEPA memorandum to Joe Wood dated 4/2/97. The Total CDD/CDF emission factor is weighted by the ratio of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) to Total CDD/CDF present in AP-42 Table 1.1-11 emission factors for coal combustion, e.g. $1.5x10^{-8}$ lime produced x ratio of [$1.43x10^{-11}$ lb 2,3,7,8-TCDD/ton coal ÷ $1.76x10^{-09}$ lb TCDD/CDF/ton coal] = $1.5x10^{-8}$ x 0.008125 = $1.2 x10^{-10}$ lb 2,3,7,8-TCDD/ton lime produced.
■ (10) Uses highest emission rate comparing fuel emission factors in Appendix E of the Application, or emission factors from a stack test at APG Lime Co. kiln baghouse outlet, reviewed in USEPA memorandum to Joe Wood dated 4/2/97. Control efficiencies (CE) for metals are used from the latter reference, and vary by metal, accordingly: Ar = 99%, Be = 99%, Cd = 90%, Total Cr = 95%, Pb = 96%, Mn = 80%, Hg = 50%, Ni = 96%, Se = 90%.

TABLE 5. SUMMARY OF METAL EMISSION FACTORS FROM STACK TESTS ON S11, P36 (LIME KILN #2)

Metal Tested	EMT Stack Test 4/7/99 Lb/ton stone	CAE Stack Test 5/20-21/99 Lb/ton stone
Barium	$5.86 x10^{-5}$	$9.85 x10^{-6}$
Beryllium	$1.74 x10^{-6}$	$2.28 x10^{-7}$
Lead	$8.42 x10^{-5}$	$6.53 x10^{-6}$
Manganese	$5.01 x10^{-4}$	$5.99 x10^{-6}$
Nickel	$3.14 x10^{-2}$	$9.54 x10^{-6}$
Stack Opacity During Test Baghouse Module Pressure Drop	4% 2.7 inches wc	opacity not reported 4.3 inches wc

Table 6. Stack S11, Units P33 & P36: LIME KILNS #1 and #2 AT MAXIMUM CAPACITY.				
Pollutant	Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY
Carbon monoxide	37.5	164	37.5	164
Nitrogen oxides	52.5	230	52.5	230
Particulate matter	1500	6570	11.2	48.9
PM10	825	3610	6.14	26.9
VOC	0.79	3.45	0.79	3.45
Sulfur dioxide	532	2,330	387	1,695
Sulfuric Acid 7664-93-9 NR 445 only	7.2	32	7.2	32
CaO 1305-78-8 NR 445	160	700	3.4	15
HCl 7647-01-0 NR 445, s.112(b)	11	49	11	49
Benzene	$6.6x10^{-3}$	59lb/year	$6.6x10^{-3}$	59lb/year
Formaldehyde 50-00-0 NR 445, s.112(b)	$1.2x10^{-3}$	11 lb/year	$1.2x10^{-3}$	11lb/year
2,3,7,8-TCDD 7647-01-0 NR 445 ,s.112(b)	$2.3x\ 10^{-9}$	0.00002 lb/year	$2.3x\ 10^{-9}$	0.00002 lb/year
Arsenic 7440-38-2 NR 445, s.112(b)	0.021	0.09	0.00021	0.0009
Barium 7440-39-3* NR 445, s.112(b)	$6.0x10^{-4}$	$2.9x10^{-3}$	$3.0x10^{-4}$	$1.4x10^{-3}$
Beryllium 7440-41-7* NR 445, s.112(b)	$3.5x10^{-3}$	$1.6x10^{-2}$	$3x10^{-5}$	$1.5x10^{-4}$
Cadmium 7440-43-9* NR 445, s.112(b)	0.03	0.13	0.0003	0.0013
Chromium VI 7440-47-3* NR 445, s.112(b)	0.0026	0.011	0.0026	0.011
Total Chromium 7440-47-3 NR 445, s.112(b)	0.51	2.2	0.026	0.11
Lead 7439-92-1* s.112(b) only	$4.2x10^{-2}$	$1.8x10^{-1}$	$1.7x10^{-3}$	$7.5x10^{-3}$
Manganese 7439-96-5* NR 445, s.112(b)	$4.8x10^{-2}$	$2.1x10^{-1}$	$9.5x10^{-3}$	$4.2x10^{-2}$
Mercury 7439-97-6* NR 445, s.112(b)	0.0005	0.002	0.0002	0.0009
Nickel 7440-02-0* NR 445, s.112(b)	14.7	64	$5.9x10^{-1}$	2.58
Selenium 7782-49-2 * NR 445, s.112(b)	0.0066	0.029	0.0007	0.003
Total Metal HAPs s.112(b) only			5.3	23

STACKS QS07, S19t, S19b, S07t, S07b, S22t, S22b, PROCESS P05, 250 TPH KILN STONE FEED - constructed or last modified in 1952.

A 615 foot long inclined conveyor was added in 1989 to convey stone from the quarry below, up to the plant. It rises 110 feet off the quarry level #1 floor. The conveyor replaced dump trucks which formerly moved stone up to the plant, and probably reduced dust levels. Stone is drawn onto a horizontal conveyor (discharge point QS07) from beneath a storage pile in the quarry. The conveor feeds the inclined conveyor, which in turn fills the storage tanks for lime kilns #1 and #2.

Tank S-22 (500 ton capacity) feeds kiln #2. The inclined conveyor is shifted to feed kiln #1 through Tanks S-19,20,21. Tanks S-19 and 20 are in the pea stone building. Tank S-21 (100 ton capacity) feeds kiln #1. The tanks are not equipped with bin vents.

Emissions of quarry stone dust are roughly equivalent from both feed systems. The PM emission factor of 0.0015 lb/ton is used to estimate conveyor emissions. It is derived from 2.1 x of 0.00072 lb PM10/ton (SCC 3-05-020-06). Emissions from feeding kiln #1 are modelled since stack heights are slightly lower.

Particulate Emissions From Stone Conveyance to Kiln #1
- PTE = 0.38 lb/hr, from horizontal drop onto the base of the inclined conveyor = 250 TPH x 0.0015 (modeled as stack QS07 at a height of 6 feet off quarry floor)
- PTE = 0.38 lb/hr, from top of Silos S-19,20 = 250 TPH x 0.0015 (modeled as stack S19t at 57 feet off plant floor);
- PTE = 0.01 lb/hr, from bottom of Silos S-19,20 = 12.5 TPH x 0.0015 (modeled as stack S19b at a height of 4 feet),
- PTE = 0.18 lb/hr, from top of tank S-21 = 12.5 TPH x 0.0015 (modeled as stack S07t at a height of 42 feet),
- PTE = 0.01 lb PM/hr, from stone fed into kiln #1 = 12.5 TPH x 0.0015 (modeled as stack S07b at a height of 20 feet),
Total PTE = 0.8 lb/hr.

Particulate Emissions From Stone Conveyance to Kiln #2
- PTE dust emitted at the horizontal drop onto the base of the inclined conveyor = 0.38 lb PM/hr = 250 TPH x 0.0015 (modeled as stack S07 at a height of 6 feet off quarry floor)
- PTE top of tank S-22 = 0.38 lb PM/hr = 250 TPH x 0.0015 (modeled as stack S22t at a height of 76 feet off plant floor),
- PTE stone fed into kiln #2 = 0.01 lb PM/hr = 25 TPH x 0.0015 (modeled as stack S22b at a height of 30 feet above grade),
Total PTE = 0.8 lb/hr.

STACKS S09, S33, S14, S15 PROCESS P06 100 TPH COAL/COKE FEED SYSTEM- constructed or last modified in 1994.

Open trucks dump a coal/coke mixture directly into one of 2 coal hoppers. The hoppers were added in 1994. A coal pile is no longer used. Coal/coke is transfered up from the hoppers, through an enclosed conveyor, to the coal crusher. Entering the crusher the size ranges from 0 to 5 inches. Crushed fuel is diverted to either coal tank C-14 (kiln #2) or tank C-15 (kiln #1). From these tanks, fuel is milled separately. The mills are enclosed. The crusher and mills produce a fuel that is 85% is less than 200 mesh. The fuel is then metered (using coal scales) to either of the kilns. The maximum fuel feed rate listed in the application is 1.72 ton/hr to kiln #1, 3.42 ton/hr to kiln #2, or 5.14 ton/hr total.

The following PM emission factors are used: 0.007 lb/ton coal unloaded (SCC 3-05-010-40), 0.11 lb/ton coal crushed (SCC 3-03-003-10), and 0.04 lb/ton processed to estimate handling emissions (SCC 3-03-003-12). Coal/coke dust emitted during conveyance and crushing is estimated as follows:
- PTE dust emitted at truck unloading = 0.7 lb PM/hr = 100 TPH x 0.007 (modeled as stack S09 at a 0 feet off plant floor),
- PTE coal/coke dust from crusher C-33 = 0.6 lb PM/hr = 5.14 TPH x 0.11 (modeled as stack S33 at 12 feet off plant floor),
- PTE coal/coke dust from top coal tank C-14 = 0.1 lb PM/hr = 3.42 TPH x 0.04 (modeled as stack S14 at a height of 68 feet),
- PTE coal/coke dust from top coal tank C-15 = 0.1 lb PM/hr = 1.72 TPH x 0.04 (modeled as stack S15 at a height of 50 feet),
Total PTE = 1.5 lb/hr.

FULLER BAGHOUSE (C01) ASH REMOVAL: CONVEYANCE STACK SD21 AND TRUCK LOADING STACK SD25

The baghouse catch is continuously removed through an air lock to dust tank D-25. The catch consists of fly ash and lime dust. Tank D-25 can hold 120 tons of catch (ash). Baghouse D-21 controls ash conveying emissions, its PM removal efficiency is 98%. The baghouse stack SD21 is on top of the tank, it discharges horizontally. Trucks are loaded under dust tank D-25.

The majority of trucks loaded are open dump trucks. These trucks deposit the ash on piles in and around the quarry. Loading is done through a square duct which discharges roughly 6 feet over the truck. I have observed a significant dust cloud over loading trucks. Water is added to the ash, to control dust and make the mixture less reactive, prior to the drop from the loading chute. The water generates steam from reaction with quicklime, so some of the apparent dust seen may be steam.

Water is not added when enclosed trucks are loaded. When enclosed trucks are used I assume 50% of the dust is captured and controlled by baghouse D-26. D-26's PM removal efficiency is 98%.

Ash removal is considered a significant emission source based on the following calculations. PM, CaO and Nickel are emitted during ash conveyance and loading to trucks. The application append. B table 4-12 states the maximum loading rate is 3 ton ash per hour, and that 10.6% of the particulate is calcium oxide (CaO). The application does not provide the percent nickel in ash. The following PM emission factors are used: 2.2 lb/ton ash conveyed (SCC 3-05-016-15), 1.5 lb/ton ash loaded to open trucks (SCC 3-05-016-27). Emission calculations are based on loading to an open truck since emissions are higher than from an enclosed truck.

The emission factor for nickel is developed from the ratios of nickel to dust (particulate matter) measured in two recent stack tests. The average of the ratios provides the percent nickel in the ash (LS means lime product):

Percent nickel #1 = $\frac{8.52 \times 10^{-3} \text{ lb nickel / ton LS}}{1.18 \text{ lb PM / ton LS}}$ (from stack test 4/7/99) (from stack stack test 4/8/99) x 100 = 0.722

Percent nickel #2 = $\frac{1.91 \times 10^{-5} \text{ lb nickel / ton LS}}{0.42 \text{ lb PM / ton LS}}$ (from stack test 5/20/99) (from stack stack test 6/18/99) x 100 = 0.0454

Average percent nickel in ash = (0.722 + 0.0454)/ 2 = 0.384 = 0.4 % by weight.

Using the above factors, emissions are estimated as follows:

Stack SD21

MTE PM = 6.6 lb/ hr = 3 TPH x 2.2 lb/ton ash conveyed (modeled as stack SD21 at a height of 70 feet),
PTE PM = 0.13 lb/hr = 3 TPH x 2.2 lb/ton x (1-0.98)
MTE CaO = 0.70 lb/hr = 3 TPH x 2.2 lb/ton ash conveyed x 0.106
PTE CaO = 0.014 lb/hr = 3 TPH x 2.2 lb/ton ash x 0.106 x (1-0.98)
MTE Nickel = 0.026 lb/hr (230 lb/year) = 3 TPH x 2.2 lb/ton ash conveyed x 0.004
PTE Nickel = 0.0005 lb/hr (5 lb/year) = 3 TPH x 2.2 lb/ton ash x 0.004 x (1-0.98).

Stack SD25

MTE PM = 4.5 lb/ hr = 3 TPH x 1.5 lb/ton ash loaded to open truck (modeled as stack SD25-f at a height of 18 feet),
PTE PM = 1.4 lb/hr = 3 TPH x 1.5 lb/ton x (1-0.70) (assumes shroud added to contain emissions)
MTE CaO = 0.48 lb/hr = 3 TPH x 1.5 lb/ton x 0.106
PTE CaO = 0.14 lb/hr = 3 TPH x 1.5 lb/ton x 0.106 x (1-0.70)
MTE Nickel = 0.018 lb/hr (160 lb/year) = 3 TPH x 1.5 lb/ton x 0.004
PTE Nickel = 0.0054 lb/hr (47 lb/year) = 3 TPH x 1.5 lb/ton x 0.004 x (1-0.70).

STACKS S15a, S15b, S15c, PROCESS P10 QUICKLIME SCREENING OR CRUSHING, STORAGE AND LOADOUT SYSTEM - constructed in 1979.

This system conveys quicklime from the kilns to loadout. Most of the time it is screened. At times the quicklime is alternately run through a crusher. It is then stored in bulk tanks. Railcars are loaded from the tanks. Roughly 35% of the quicklime is moved directly to hydrate and milling operations. The system is rated to move 20 TPH of quicklime with enclosed screw augers. Most of the time quicklime from the kilns is screened before being discharged to storage tanks.

There are 7 quicklime storage tanks with bulk loadout capability. Only one is actually used for bulk loadout, tank #4, aka tank QL-73. A bin vent filter controls emissions when tank #4 is loaded. Tank #4 is usually unloaded into enclosed rail car hoppers, and can unload into enclosed truck hoppers. A filter controls emissions which exit the hoppers during loading. The other 6 storage tanks are not equipped with either silo filters or hopper filters.

Because quicklime can only move through the crusher or the screen, the highest emission factor is used (crusher).

The company requests that the permit require filters on all storage tanks not currently equipped. They are tanks QL-70, QL-71, QL-72, QL-74, QL-75 and QL-76. Therefore the PTE of all tanks includes the filters 90% PM control.

New Source Review Applicability

This process was constructed and last modified in 1979

Control Devices

The system is controlled by a bin vent (QL-65) and loadout hopper filter (QL-30), and a filter downstream of the screen and crusher (QL-24). The overall control efficiency is estimated at 99% for PM, PM10 and HAPs.

Applicable Requirements

Emission Limit for Particulate Matter

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 10.0 lb/hr, that ambient air quality standards are protected. The particulate equations provide less restrictive limits. The emission limit using the equation of 415.05(2) provides E = 13.6 lb/hr = $3.59(7.75 \text{ tph})^{0.62}$. The emission limit calculated under 415.05(1)(m) provides E = 11.7 lb/hr = [14,800 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(140+460) x 60 min/hr]. Thus the emission limit will be 10.0 lb/hr.

Emission Limits for Other NR 445 Table 3 HAPs

Not indoor fugitives so are not exempt.

Emissions Estimate

Particulate Estimate

There are 3 silo unloading areas that accomodate either rail car or truck. The loadout areas are: mainly QL-73a, 73b, 73c, rarely QL-70, 71, 72 and rarely QL-74 and 75. Don Brish requested the following assumptions are used for process P10 (phone conversation 11/18/98):

1. assume would load from only one loadout area at a time, at the rate of 20 TPH
2. assume railcar/semi has the following stack parameters: height = 18 feet, diameter = 12 feet, flow = 1000 cfm
3. assume 50% of loadout emissions from QL-73 are not captured by C30, and none are captured from other storage areas
4. 10% of conveying emissions to QL-73 et. al. are uncaptured by filter C65, these fugitives are emitted at height = 87 feet
5. 100% of conveying emissions to storage areas QL-70, 71, 72 are uncontrolled, and emitted at height = 61 feet
6. 100% of conveying emissions to storage areas QL-74, 75, 76 are uncontrolled, and emitted at height = 53 feet

S24, P10 Conveying and Screening/crushing quicklime from kiln
S30, P10 Quicklime bulk loadout from storage tank QL-73 (C30)
S65, P10 Quicklime filling of storage tank QL-73 (C65)

Table7. Stack S24, Unit P10: QUICKLIME SCREENING BY QL-32 AND CONTROL BY QL-24 @ 20 TON PER HOUR.[1]

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Particulate matter	--	--	44	190	0.88	3.9
PM10	--	--	44	190	0.88	3.9
Calcium oxide (1305-78-8), NR 445 only[2]	--	--	26	110	0.52	2.3

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 2.2 lb/ton product transfer and conveying, 98% control is assumed.
(2) Based on PM emissions factors and assumption that 58% of PM is CaO, (T5 application Table 4-13)

Table 8. Stacks S65, S65-f Unit P10: QUICKLIME TRANSFER TO QL-73 AND CONTROL BY QL-65 @ 20 TON PER HOUR.[1]

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
S65 Particulate matter	--	--	41.8	180	0.84	3.7
PM10	--	--	41.8	180	0.84	3.7
Calcium oxide (1305-78-8), NR 445 only [2]	--	--	24.2	100	0.48	2.1
S65-f Particulate matter	--	--	2.2	9.6	2.2	9.6
PM10	--	--	2.2	9.6	2.2	9.6
Calcium oxide (1305-78-8), NR 445 only	--	--	1.3	5.6	1.3	5.6

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 2.2 lb/ton product transfer and conveying. S65 assumes 95% of dust is captured and controlled by baghouse QL-65, QL-65 provides 98% control. S65-f represents the 5% not captured.
(2) Based on PM emissions factors and assumption that 58% of PM is CaO, (T5 application Table 4-13)

Table 9. Stacks S30, S30-f Unit P10: QUICKLIME LOADOUT FROM QL-73 AND CONTROL BY QL-30 @ 20 TON PER HOUR.[1]

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
S30 Particulate matter	--	--	11.6	51	0.23	1.0
PM10	--	--	11.6	51	0.23	1.0
Calcium oxide (1305-78-8), NR 445 only [2]	--	--	6.7	29	0.13	0.6
S30-f Particulate matter	--	--	0.61	27	0.61	2.7
PM10	--	--	0.61	27	0.61	2.7
Calcium oxide (1305-78-8), NR 445 only	--	--	0.35	15	0.35	1.5

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 0.61 lb/ton lime for loading enclosed truck from AP-42. S30 assumes 95% of dust is captured and controlled by baghouse QL-30, QL-30 provides 98% control. S30-f represents the 5% not captured.
(2) Based on PM emissions factors and assumption that 58% of PM is CaO, (T5 application Table 4-13)

Table 10. PROCESS P12: QUICKLIME FROM KILN LOADOUT SYSTEM AT MAXIMUM CAPACITY OF 20 TON LIME PER HOUR. - installed in 1986.

Pollutant And Source	Actual Emissions 1997 throughput of 69,084 tons (P44-01)		Maximum Theoretical		Controlled Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
S24 Crushing or Screening Quicklime from kiln -- 100% of emission from control device C24:								
Particulate matter	--	0.12	0.72	3.15	0.01	0.04	0.1	0.44
Calcium oxide (1305-78-8), NR 445 only							0.06	0.25

S71a Conveying to Quicklime Silos QL-70, 71, 72 -- 100% of emission from top of silos uncontrolled:								
Particulate matter	--	0.2	0.1	0.4	0.1	0.4	0.1	0.4
Calcium oxide (1305-78-8), NR 445 only							0.06	0.25
S71b Bulk loadout from Quicklime Silos QL-70, 71, 72 -- 100% of emission from top of car hopper uncontrolled:								
Particulate matter	--	0.1	6.1	26.7	0.06	0.27	0.1	0.4
Calcium oxide (1305-78-8), NR 445 only							0.06	0.25
Total								
Particulate matter	--	11	14	61	6.4	27	6.5	28
Calcium oxide (1305-78-8), NR 445 only	--	6.4	8.1	35	3.7	16	3.8	16

- 0.036 lb/ton lime for fine crushing (T5 application Table 4-13) assumed to represent quicklime screening because it is comparable to the AP-42 emission factor of 0.00013 lb/ton lime, from AP-42 Table 11.17-4, 1/95, at 99.6% control.
- 0.026 lb/ton lime for each conveying transfer point (T5 application Table 4-13).
- 0.61 lb/ton lime for loading, enclosed truck from AP-42 Table 11.17-4, 1/95, assume 50% filtered, (T5 application Table 4-13)
- Control efficiency of dust collectors is 99%. Assume 58% of PM is CaO, (T5 application Table 4-13).

STACK S12, PROCESS P37 12 TPH KENNEDY ATMOSPHERIC HYDRATOR - constructed or last modified in 1954.

This hydrator uses up to 10 ton per hour of quicklime to produce, with added water, up to 12 ton per hour of Type "N" hydrated lime.

New Source Review Applicability

This process was constructed and last modified in 1954 and therefore is not subject to review.

Control Devices

The atmospheric hydrator exhausts to a KVS wet cyclone, C02. It may control some emissions of particulate matter. The control efficiency is unknown however, therefore none is assigned in these calculations.

Applicable Requirements

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 0.8 lb/hr, that ambient air quality standards are protected. The particulate limit derived from the equation provides a less restrictive limit. The emission limit calculated under 415.05(1)(o) provides E = 3.7 lb/hr = [2,500 acfm x (.075 lb gas/ft^3 gas) x 0.4 lb/1000 lb gas x (68+460)/(190+460) x 60 min/hr]. Thus the emission limit will be 0.8 lb/hr.

Emissions Estimate

Only one of the hydraters can operate at a time. P37 operated only 1 day per week in 1997. Theoretical calculations however, assume that P37 operates 8760 hours per year.

Table 11. Stack S12, Unit P37: ATMOSPHERIC HYDRATOR PRODUCING 12 TON HYDRATED LIME PER HOUR.[1]						
Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY

Particulate matter	0.77	0.038	0.80	3.5	0.80	3.5
PM10	0.77	0.038	0.80	3.5	0.80	3.5
CaOH 1305-62-0 NR 445	0.46	2.0	0.48	2.1	0.48	2.1

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-2 of 0.067 lb/ton hydrated lime produced. No control is assumed.
(2) Based on PM emissions factors and assuming 60% is CaOH.

TYPE "S" HYDRATE LIME PRODUCTION PROCESS - BASIC EMISSION UNITS:

S17, P11 QUICKLIME MILLING AND TRANSFER TO PRESSURE HYDRATOR, BAGHOUSE QL-46
S13, P38 CORSON PRESSURE HYDRATOR
S21, P20 POST-HYDRATION MILLING, BAGHOUSE HL-1

STACK S17, PROCESS 11 15 TPH QUICKLIME MILLING AND TRANSFER TO PRESSURE HYDRATOR

All quicklime must be milled prior to entering the pressure hydrator. Up to 15 ton per hour of quicklime is milled and transfered to the pressure hydrator. It is assumed the mill was installed when the pressure hydrator was installed, in June 1982.

Control Devices

Dust emitted by milling and transfer is controlled by collector QL-46. QL-46 is a baghouse, C13. A control efficiency of 98% is assumed in these calculations. Collected quicklime is returned to the system.

Applicable Requirements

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 0.7 lb/hr, that ambient air quality standards are protected. The particulate limit derived from the equation provides a less restrictive limit. The emission limit calculated under 415.05(1)(m) provides E = 3.7 lb/hr = [1,560 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(190+460) x 60 min/hr]. Thus the emission limit will be 0.8 lb/hr.

Emissions Estimate

Table 12. Stack S17, Unit P11: QUICKLIME MILLING AND TRANSFER TO PRESSURE HYDRATOR @ 15 TON PER HOUR. (1)

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Particulate matter	--	--	33	144	0.7	3.1
PM10	--	--	33	144	0.7	3.1
CaO (2)	--	--	19	83	0.4	1.8

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 2.2 lb/ton product transfer and conveying, 98% control is assumed.
(2) Based on PM emissions factors and assumption that 58% of PM is CaO, (T5 application Table 4-13)

STACK S13, PROCESS P38 20 TPH CORSON PRESSURIZED HYDRATOR - constructed or last modified in 1982.

This hydrator uses up to 15 ton per hour of quicklime, to produce up to 20 ton per hour of Type "S" hydrate lime. Water is added in the process. The water-quicklime mixture is then heated to 400 °F and pressurized to 150 psi in the hydrator. The retention time of the mixture in the hydrator is about thirty minutes. The hydrated lime is then blown into a second vessel and flash dried to a moisture content of less than one percent.

New Source Review Applicability

This permit recognizes a production increase of 12.5 tph to 20 tph to be made in 1999. These physical changes will cause an increase in particulate matter emissions. The increase in capacity is provided mainly by improved material handling downstream from P38. Larger, N-type and S-type hydrated lime tanks HL-7 and HL-8, and ball mill HL-10 will be upgraded. Air separator HL-15 will be replaced with a baghouse. Baghouse HL-1 will also be replaced with a new baghouse.

Assuming the increase, the source's MTE for PM10 is 2.0 pounds per hour, less than 3.4 pounds per hour. The new MTE of CaOH is 1.2 pounds per hour, less than 1.752 pounds per hour allowed under NR 445 Table 4 for a stack height greater than 25 feet. Therefore a new source review is not required prior to modification of the source.

Control Devices

The pressure hydrator exhausts to a cyclone, C03, that is equipped with water spray nozzles. It may control some emissions of particulate matter. The control efficiency is unknown, however, therefore none is assigned in these calculations. Collected hydrated lime is returned to the system. The bottoms from the scrubber drain to a suspended solids mix tank and clarifier. Thickended process water from the mix tank is returned to the hydrator. The clarifier discharges a milky white hydrated lime solution to the quarry.

Applicable Requirements

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 2.0 lb/hr, that ambient air quality standards are protected. The particulate equations provide less restrictive limits. The emission limit using the equation of 415.05(2) provides $E = 21 \text{ lb/hr} = 3.59(20 \text{ tph})^{.62}$. The emission limit calculated under 415.05(1)(m) provides E = 3.7 lb/hr = [5,200 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(200+460) x 60 min/hr]. Thus the emission limit will be 2.0 lb/hr.

Emissions Estimate

Only one of the hydraters can operate at a time. P38 operated 5 days per week in 1997. Theoretical calculations assume that P38 operates 8760 hours per year.

Table 13. Stack S13, Unit P38: PRESSURE HYDRATOR PRODUCING 20 TON HYDRATED LIME PER HOUR. (1)

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Particulate matter	1.4	2.9	2.0	8.8	2.0	8.8
PM10	1.4	2.9	2.0	8.8	2.0	8.8
CaOH 1305-62-0 NR 445	0.84	1.7	1.2	5.3	1.2	5.3

(1) Based on uncontrolled PM emissions factor from air inventory of 0.1 lb/ton hydrated lime produced. No control is assumed.
(2) Based on PM emissions factors and assuming 60% is CaOH.

STACK S21, PROCESS P20 20 TPH POST-HYDRATION MILLING - constructed or last modified in 1954.

Up to 20 ton per hour of hydrated lime from the hydrators is transfered and milled, prior to storage. Dust emitted by transfer and is controlled by collector HL-1.

Control Devices

HL-1 is a baghouse. Its control efficiency is assumed to be 98%. Collected hydrated lime is returned to the system.

Applicable Requirements

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 0.9lb/hr, that ambient air quality standards are protected. The particulate limit derived from the equation provides a less restrictive limit. The emission limit calculated under 415.05(1)(m) provides E = 1.0 lb/hr = [1,120 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(75+460) x 60 min/hr]. Thus the emission limit will be 0.9 lb/hr.

Emissions Estimate

Table 14. Stack S21, Unit P20: HYDRATED LIME TRANSFER AND MILLING @ 20 TON PER HOUR.(1)

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Particulate matter	--	--	44	193	0.9	3.9
PM10	--	--	44	193	0.9	3.9
CaOH (2)	--	--	26	116	0.5	2.4

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 2.2 lb/ton product transfer and conveying, 98% control is assumed.
(2) Based on PM emissions factors and assumption that 60% of PM is CaOH.

STACKS S22 S23, PROCESS P21 55 TPH HYDRATE BAGGING AND LOADOUT - constructed or last modified in 1954.

Up to 55 ton per hour of hydrated lime from the hydrate storage tanks is transferred, bagged or moved through bulk loading. Dust emitted by stack S22 comes from bagging, it is controlled by collector BL-17. Dust emitted by stack S23 comes from bulk loadout, it is controlled by collector BL-68.

Control Devices

BL-17 and BL-68 are baghouses. Their control efficiency is assumed to be 98%. Collected hydrated lime is returned to the system.

Applicable Requirements

Ambient air quality modeling determined that if particulate matter is emitted at the emission rate of 0.9lb/hr, that ambient air quality standards are protected. The particulate limit derived from the equation provides a less restrictive limit. The emission limit calculated under 415.05(1)(m) provides:

S22 E = 3.7 lb/hr = [4,212 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(75+460) x 60 min/hr],
S23 E = 2.1 lb/hr = [2,400 acfm x (.075 lb gas/ft^3 gas) x 0.2 lb/1000 lb gas x (68+460)/(75+460) x 60 min/hr].

Thus, for both S22 and S23 the emission limit will be _____ lb/hr.

Emissions Estimate

Table 15. Stacks S22 Units of P21: HYDRATED LIME BAGGING AND CONTROL BY BL-17 @ 20 TON PER HOUR.[1]						
Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Particulate matter	--	--	44	193	0.9	3.9
PM10	--	--	44	193	0.9	3.9
CaOH [2]	--	--	26	116	0.5	2.3

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 2.2 lb/ton product transfer and conveying, 98% control is assumed.

(2) Based on PM emissions factors and assumption that 60% of PM is CaOH.

Table 16. Stacks S73-f Unit P21: HYDRATE TRANSFER TO BL-73 @ 20 TON PER HOUR.[1]						
Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
S73-f Particulate matter	--	--	4	18	4	18
PM10	--	--	4	18	4	18
CaOH (1305-78-8), NR 445 only	--	--	2	10	2	10

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 2.2 lb/ton product transfer and conveying.

Table 17. Stacks S23, S23-f Unit P21: HYDRATE BULK LOADOUT FROM BL-73 AND CONTROL BY BL-68 @ 20 TON PER HOUR.[1]						
Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
S23 Particulate matter	--	--	11.59	50.76	0.23	1.02
PM10	--	--	11.59	50.76	0.23	1.02
CaOH (1305-78-8), NR 445 only [2]	--	--	6.95	30.44	0.14	0.61
S23-f Particulate matter	--	--	0.61	2.7	0.61	2.7
PM10	--	--	0.61	2.7	0.61	2.7
CaOH (1305-78-8), NR 445 only	--	--	0.37	1.6	0.37	1.6

(1) Based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 0.61 lb/ton lime for loading, enclosed truck from AP-42. S23 assumes 95% of dust is captured and controlled by baghouse BL-68, BL-68 provides 98% control. S23-f represents the 5% not captured.

(2) Based on PM emissions factors and assumption that 60% of PM is CaOH.

The conveyor is inside the building a goes directly into the butler bin.

Table 18. Stacks S79-f Unit P21: ATM. HYDRATE CONVEY AND BULK LOADOUT FROM BUTLER BIN BL-79 @ 12 TON PER HOUR.(1)						
Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
S79-f Particulate matter	--	--	7.3	32	7.3	32
PM10	--	--	7.3	32	7.3	32
CaOH (1305-78-8). NR 445 only	--	--	4.2	18	4.2	18

(1) Loadout emissions are emitted from stack S79-f. The emission rate is based on uncontrolled PM emissions factor from AP-42 Table 11.17-4 of 0.61 lb/ton lime for loading, enclosed truck from AP-42.
(2) Based on PM emissions factors and assumption that 60% of PM is CaOH.

EARLY HAZARDOUS POLLUTANT EMISSION REDUCTION OPTION

CONTROL TECHNOLOGY REVIEW

This section should hi-light any control technology which is not straight forward in its efficiency or has other peculiarities which should be identified. Pollution prevention should be discussed where applicable.]

AIR QUALITY REVIEW

[A discussion of the results of ambient air quality modelling should be provided here. PSD baseline settings should be included here. Also include a description of the site. Please copy itm number A. and D. from the modelling analysis.

FACILITY EMISSIONS

Actual emissions are the total emissions generated by the emission sources identified below over the specified time period taking into account any reductions made by a control device or technique. Maximum theoretical emissions are the quantity of air contaminants that theoretically could be emitted by the emissions sources identified below, without considering emission control devices, based on the design capacity of the source. Potential to emit is the maximum capacity of the emission sources identified below to emit any air contaminant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air contaminant shall be treated as part of its design if the limitation is Federally enforceable.

Provide a unit by unit emissions summary `followed by a summary of total facility emissions.`

A. STACK EMISSIONS

1. Stack #, Unit #: S07 P04
Unit description: Material transfer: New kiln stone system

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	6.79000	1- lb/hr	9.18000	58.54000	1- lb/hr	256.41000	256.41000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S07
Coke is not a virgin fossil fuel under NR 445 says Steve Dunn.

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY

2. Stack #, Unit #: S08 P05
Unit description: Material transfer: Kiln stone system

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	5.09000	1- lb/hr	6.88000	40.11000	1- lb/hr	175.67000	175.67000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S08

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY

3. Stack #, Unit #: S09 P06
Unit description: Coal/coke conveying system

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	0.99000	1- lb/hr	0.36000	4.15000	1- lb/hr	18.16000	18.16000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S09

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY

10. Stack #, Unit #: S16 P13
Unit description: Material transfer: Hydrate milling section

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	0.66000	1- lb/hr	2.06000	3.03000	1- lb/hr	13.29000	13.29000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S16

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY
1305-78-8	1.19000	TPY	7.70000	TPY	7.70000

11. Stack #, Unit #: S17 P11
Unit description: Dust collectors (QL-46): Hydrate and milling operations

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	0.00200	1- lb/hr	0.00500	0.39000	1- lb/hr	1.71000	1.71000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S17

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY
1305-78-8	0.00300	TPY	1.00000	TPY	1.00000

12. Stack #, Unit #: S20 P22
- Unit description: Material transfer: Hydrate and milling operations

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	0.21000	1- lb/hr	0.65000	0.54000	1- lb/hr	2.36000	2.36000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S20

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY
1305-62-0	0.38000	TPY	1.37000	TPY	1.37000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S21

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY
1305-62-0	0.00300	TPY	1.32000	TPY	1.32000

14. Stack #, Unit #: S22 P23
Unit description: Bulk loading: Hydrated lime bagging sections

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	1.96000	1- lb/hr	2.02000	0.00000	1- lb/hr	0.00000	0.00000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S22

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY
1305-62-0	1.17000	TPY	0.00000	TPY	0.00000

15. Stack #, Unit #: S23 P21
Unit description: Dust collectors (BL-17 and BL-68): Hydrate lime bagging operations

Pollutant	Actual Emissions			Maximum Theoretical			P.T.E.
		Units	TPY		Units	TPY	TPY
Particulate matter emissions	0.06000	1- lb/hr	0.06000	47.30000	1- lb/hr	207.17000	26.06000

HAZARDOUS AIR POLLUTANT EMISSIONS FOR STACK: S23

Pollutant	Actual Emissions		Maximum Theoretical		Potential to Emit
		Units		Units	TPY
1305-62-0	0.03000	TPY	120.16000	TPY	120.16000

B. FACILITY EMISSIONS

Pollutant	Actual Emissions	Potential to Emit
	TPY	TPY
Beryllium and beryllium compounds, as Be	0.00050	0.07070
Carbon monoxide	1.77000	19.96000
Nitrogen oxides	5.50000	79.83000
Sulfur dioxide	377.00000	2348.00000
Particulate matter emissions	33.42100	838.50000
Volatile Organic Compounds	0.12000	1.06000

FACILITY STATUS UNDER PART 70

[A discussion of the facility's potential to emit and the Part 70/Non-part 70/Synthetic minor non-Part 70 status of the facility should be discussed here.]

COMPLIANCE DEMONSTRATION MONITORING METHODS

A pressure drop of 0.5 inches indicates freshly changed bags. The tube sheet (module) pressure drop needs to be monitored, instead of the drop across the whole baghouse, if Δp is to be correlated with control efficiency. Further, Δp across a module has to be over 3½ inch to achieve high TSP removal efficiency -- this indicates a healthty buildup of filter cake. Conversation with John Vaklyes, P.E., Fuller Co. 3/2/99, 610/264-6310.

When both kilns are running, both fans are running and there is a greater pressure drop across each compartment, presumably 3-31/2 inches, here are the comp demo conditions:

time between cleaning of each bag shall be no more than 11 minutes.
minimum inlet pressure drop shall be greater than 8 inches

When only one kiln is running, only one fan is running and there is too low a pressure drop across each compartment, not the required 3-31/2 inches, here are the comp demo conditions:

time between cleaning shall be lengthened to 1 hour.
Modules x,y,z shall be closed
measure pressure drops each shift on each module and maintain a 31/2 pressure drop across each module in operation.

[A discussion on the methods of compliance monitoring the source has proposed or the methods of compliance which will be incorporated into the permit should be included here. Submittal dates for compliance monitoring reports and compliance monitoring certification submittals should also be mentioned. Any applicable enhanced monitoring requirements listed in 40 CFR Part 64 should also be discussed.]

AIR QUALITY ANALYSIS

The lime kiln No. 2 was modeled during the original permit review (for permits #s NS-78-36-61 and EPA-5-A-79) to demonstrate that the allowable emissions from the kiln No. 2 will not cause or contribute to a violation of the particulate, SO_2, NO_x and CO National Ambient Air Quality Standards or the maximum allowable PSD increments.

The proposed review will not result in the increase of any allowable emissions. Thus no new air quality analysis need to be performed.

FACILITY COMPLIANCE STATUS

The Department finds that:

1. The source will meet applicable emission limits and other requirements.
2. The source will not cause nor exacerbate a violation of an ambient air quality standard or ambient air increment.

Include the following if the facility is currently out of compliance and the air permit will include a compliance plan:
Section 285.64, Wis. Stats., sets forth criteria for the approval of operation permits for existing sources which are not in compliance with applicable emission limits and other requirements. The Department finds that:

3. The existing source does not comply with the applicable requirements.

Therefore, the operation permit should (or will) include all of the following:

(a) A compliance schedule that sets forth a series of remedial measures that the owner or operator of the existing source must take to comply with the requirements which the existing source is violating.

(b) A requirement that, at least once every 6 months, the owner or operator of the existing source submit reports to the Department concerning the progress in meeting the compliance schedule and the requirements which the existing source is violating.

In order to satisfy the requirements of item 3. above, the following compliance plan and reporting requirements will be included in the operation permit:

PRELIMINARY DETERMINATION

The Wisconsin Department of Natural Resources has reviewed the permit application and other materials submitted by Rockwell Lime Company and hereby makes a preliminary determination that an operation permit may be issued with the following Draft Applicable Limits and Draft Permit Conditions.

ROCKWELL lime company

4110 Rockwood Rd. Manitowoc, Wisconsin 54220-9619
Local - 414-682-7771
Watts - 1-800-558-7711
Fax - 414-682-7972

October 5, 1993

Mr. Rajen M. Vakharia
Environmental Engineer
Engineering & Surveillance Section
Bureau of Air Management
101 South Webster St., GEF 11
P.O. Box 7921
Madison, WI 53707

Dear Raj,

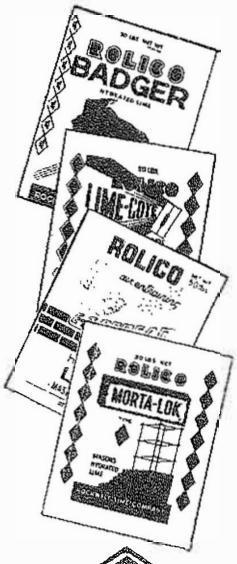
Enclosed you will find an application to amend our Federal PSD Permit for the No. 2 Kiln as prepared by Dames & Moore. After examining the application, if you have any questions, please feel free to contact me.

Regarding your requests for oxygen reading during our October 15, 1992 stack test, I have found that the O2 monitor was not working properly during that test. I have gone through our records and have found, that at similar production rates, the excess oxygen in the kiln normally ranges between 1 and 2.5%.

Sincerely,

ROCKWELL LIME COMPANY

Donald R. Brisch
V.P. of Operations



TIGER AIRO
TIGER JIFFI SOAK

Manufacturers of
MORTA-LOK (Type S Masonry) • E-Z SPREAD A/E (Type S Masonry Stucco) • LIME COTE (Type S Finishing) • BADGER (Type N)

APPLICATION TO AMEND
A DELEGATED FEDERAL PSD PERMIT FOR KILN NO. 2

FOR

ROCKWELL LIME COMPANY
ROCKWOOD, WISCONSIN

DAMES & MOORE

D&M Job No. 14775-004-140
October 4, 1993

[d:\...\job\14775004\rock0922.rpt]

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APPLICATION TO AMEND
A DELEGATED FEDERAL PSD PERMIT FOR KILN NO. 2
ROCKWELL LIME COMPANY
ROCKWOOD, WISCONSIN

1.0 INTRODUCTION

Rockwell Lime Company (RLC) received federal and state construction permits for Kiln No. 2 in 1979. Both permits specify that the maximum sulfur content of the fuel(s) burned in the kiln is 2.1 percent. The state permit allows this limit to be met by burning a mix of fuels -- gas, coal and petroleum coke. The federal permit (see Appendix A), however, specified that this limit applies only to coal.

At the present time, RLC is burning a blend of these three fuels in the kiln. Because the federal permit differs from the state permit, RLC is interested in resolving this difference so that the federal permit is consistent with the state permit. This will assure that RLC will be allowed to continue burning the fuel blend in demonstrating compliance with the 2.1 percent sulfur limit.

Under a delegation of a authority from USEPA, the WDNR is authorized to amend the federal PSD permit. WDNR is willing to review the PSD permit and has suggested that RLC submit the appropriate application forms. Accordingly, this report represents the RLC application on which WDNR may base its approval of an amendment to the federal permit. The report includes the application forms which are enclosed in Appendix B.

2.0 DESCRIPTION OF LIME KILN NUMBER 2

The subject of the federal permit is Kiln No. 2 which produces dolomitic lime. Kiln No. 2 is of a rotary type. It is principally a furnace made of heavy steel plate lined with refractory brick. It has a diameter and length of approximately 8 feet and 225 feet, respectively. Its fuel is a blend of natural gas, coal, and petroleum coke.

The kiln is installed at about a 3° inclination on four foundation piers and revolves on trunnions at 45-75 seconds per revolution. Limestone is fed into the elevated end of the kiln and is discharged as quicklime at the lower end. Cooling air is induced into the discharge end of the product cooler and into the kiln as secondary combustion air. The combustion gases flow countercurrently to the flow of the stone at the charging end, where they are used to preheat the kiln feed.

Kiln No. 2 can handle a range of stone feed sizes between 1/4-inch and 2 1/2-inches. When the feed size range is narrow and the minimum size is above 1/2-inch, a high degree of mixing in the bed during calcination produces a very uniform lime. Approximately 2 tons of feedstone are required to manufacture a ton of lime.

Heat input to Kiln No. 2 is rated at 85 million BTu per hour. At this rating, fuel consumption is equivalent to 3.54 tons per hour (tph) of coal or 3.18 tph of coal/petroleum coke blend. This fuel rate, in turn, enables Kiln No. 2 to produce 300 tons per day of dolomitic lime at a feedstone rate of approximately 600 tons per day.

Emissions from Kiln No. 2 come from the calcination of the feedstone and the combustion of fuel. Kiln No. 2 is equipped with a baghouse to reduce its emissions during operation. The removal efficiency of particulate matter (PM) in this baghouse is 99.83 percent.

3.0 ESTIMATE OF EMISSIONS FROM KILN NO. 2

Table 3-1 presents a summary of estimated emissions of criteria pollutants from Kiln No. 2. The emission rates are based on either emission factors from AP-42 ("Compilation of Air Pollutant Emission Factors", Volume I, USEPA, September 1990) or the emission limitation from the federal permit. The equation to estimate the pollutant emission rate in tons per year (tpy) is:

Emission Rate = Process Rate X Emission Factor X
X 8,760 hours/year ÷ 2,000 pounds/ton

Under the PSD regulations, the threshold applicable to Kiln No. 2 for any criteria pollutant is 100 tpy to determine if it is a major source. This threshold is exceeded for several pollutants. As a consequence, all pollutants having annual emissions from Kiln No. 2 exceeding the significant emission levels presented in Table 3-2 would be subject to PSD review. Kiln No. 2 was subject to PSD review for all criteria pollutants except ozone (i.e., volatile organic compound emissions). Region 5 of USEPA has determined that Kiln No. 2 satisfied all the applicable requirements of the PSD regulations, and thus, a permit was approved accordingly.

TABLE 3-1

ESTIMATED POTENTIAL EMISSIONS OF CRITERIA POLLUTANTS FROM KILN NO. 2

POLLUTANT	EMISSION FACTOR[1]	PROCESS WEIGHT RATE	CONTROL MEASURE	PERCENT EFFICIENCY	EMISSION RATE (lb/hr)	ANNUAL EMISSIONS[2] (tons)
Particulate Matter (TSP)	0.595 lb/ton lime produced[3]	12.5 tons/hr lime produced	Baghouse	99.83	7.44	32.58
Particulate Matter (PM-10)	0.327 lb/ton lime produced[4]	12.5 tons/hr lime produced	Baghouse	99.83	4.09	17.92
Nitrogen Oxides	2.8 lb/ton lime produced[5]	12.5 tons/hr lime produced	Good Combustion	--	35.00	153.30
Carbon Monoxide	2.0 lb/ton lime produced[6]	12.5 tons/hr lime produced	Good Combustion	--	25.00	109.50
Volatile Organic Compounds	0.07 lb/ton coal fired[7]	3.54 ton/hr coal fired	Good Combustion	--	0.25	1.09
Sulfur Dioxide (Coal Combustion)	2.1 lb/ton S in the coal[8]	3.54 ton/hr coal fired	Lime/Limestone Reaction, Baghouse	50.0	148.54	650.61
Sulfur Dioxide (Fuel Blend Combustion)	2.1 wt. % S in the fuel blend[9]	3.18 ton/hr fuel blend fired	Lime/Limestone Reaction, Baghouse	50.0	133.44	584.45

(1) Emission factors derived from AP-42, "Compilation of Air Pollutant Emission Factors, Volume I, Stationary Point and Area Sources," USEPA, Sept. 1990.
(2) Annual emissions based on 8,760 hours per year operation and maximum hourly emissions rate.
(3) Based on AP-42, Table 8.15-1, lime kiln uncontrolled PM emissions factor (350 lb./ton.) and 99.83% control stated in the permit.
(4) Based on TSP emissions factor and AP-42. Table 8.15-2, particle size distribution for a lime kiln with a fabric filter baghouse. Cumulative mass less than 10 micron aerodynamic particle size; 55% by weight.
(5) Based on AP-42, Table 8.15-1, lime kiln uncontrolled NO_x emissions factor.
(6) Based on AP-42, Table 8.15-1, lime kiln uncontrolled CO emissions factor.
(7) Based on AP-42, Table 1.1-1, non-methane organic compound emissions factors for coal combustion.
(8) Based on AP-42, Table 8.15-1, footnotes f and h, the coal maximum sulfur content, and 50% control
(9) Based on AP-42, Table 8.15-1, foomotes f and h, the fuel blend maximum sulfur content, and 50% control.

[d:\...\job\14775004\rock0922.3-1]

TABLE 3-2

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS), PSD INCREMENTS, SIGNIFICANT EMISSION RATES, SIGNIFICANT IMPACT INCREMENTS, AND MONITORING DE MINIMIS CONCENTRATIONS

POLLUTANT	AVERAGING PERIOD	NAAQS ($\mu g/m^3$)		PSD INCREMENTS ($\mu g/m^3$)			SIGNIFICANT EMISSION RATES (tons/year)	SIGNIFICANT IMPACT INCREMENTS ($\mu g/m^3$)	MONITORING DE MINIMIS CONCENTRATIONS ($\mu g/m^3$)
		PRIMARY	SECONDARY	CLASS I	CLASS II	CLASS III			
Total Suspended Particulate Matter (TSP)	Annual	--	--	5[a]	29[a]	37[a]	25	1	--
	24-Hour	--	--	10[a,b]	37[a,b]	75[a,b]		5	10
Particulate Matter Less than 10 μm (PM-10)	Annual	50	[c]	4	17	34	15	1	--
	24-Hour	150[d]	[c]	8	30	60		5	10
Sulfur Dioxide	Annual	80	--	2	20	40	40	1	--
	24-Hour	365[b]	--	5[b]	91[b]	182[b]		5	13
	3-Hour	--	1300[b]	25[b]	512[b]	700[b]		25	--
Nitrogen Dioxide	Annual	100	[c]	2.5	25	50	40	1	14
Ozone	1-Hour	235[d]	[c]	--	--	--	40[e]	--	[e]
Carbon Monoxide	8-Hour	10,000[b]	[c]	--	--	--	100	500	575
	1-Hour	40,000[b]	[c]	--	--	--		2000	--
Lead	Calendar Quarter	1.5	[b]	--	--	--	0.6	--	0.1
Total Reduced Sulfur (TRS) Reduced Sulfur Compounds	1-Hour	--	--	--	--	--	10	--	10
Asbestos	--	--	--	--	--	--	0.007	--	--
Mercury	24-Hour	--	--	--	--	--	0.1	--	0.25
Beryllium	24-Hour	--	--	--	--	--	0.0004	--	0.001
Fluorides	24-Hour	--	--	--	--	--	3	--	0.25
Vinyl Chloride	24-Hour	--	--	--	--	--	1	--	15
Sulfuric Acid Mist	--	--	--	--	--	--	7	--	--
Hydrogen Sulfide	1-Hour	--	--	--	--	--	10	--	0.2

[a] TSP increment to be replaced by PM-10 increment effective June 3, 1994.
[b] Concentration not to be exceeded more than once per year.
[c] Same as primary NAAQS.
[d] Expected number of days in which one or more concentrations exceed this value must be greater than 1.
[e] Emissions of volatile organic compounds.
[f] Increase in volatile organic compounds of more than 100 tons/year.

[d:\...\table\naaqs-2.rev]

4.0 REQUIREMENTS OF PERMIT AMENDMENT

Regarding permit modifications, the USEPA published the following guidance document; "Revised Draft Policy on Permit Modifications and Extensions", Darryl D. Tyler, Director of the Control Programs Development Division (MD-15), USEPA, July 5, 1985.

The permit modification policy identifies four categories of change to a permit and the approval requirements of each category. These changes are identified as administrative, minor, significant or fundamental. Based on the policy, this application in seeking to amend the federal permit would meet the category of "administrative" change and its associated level of review which is classified as "amendment". The administrative change to the federal permit constitutes an amendment, because it is administrative in nature and results in no increase in emissions or air quality impact from Kiln No. 2. The absence of any increase in emissions or air quality impact requires little or no review of the existing permit. According to the policy, proposed amendments to permits do not require any reanalysis of the basic review originally conducted and need not be subject to public participation requirements.

5.0 CONCLUSION

The permit amendment on which this application is based would allow Kiln No. 2 to burn a fuel blend which continues to meet the limitation of 2.1 percent sulfur content. Based on the permit modification policy, this application proposes an administrative change, because no increase in emissions or air quality impact is attributable to Kiln No. 2. RLC is confident that this application is complete under the terms of the aforementioned policy.

Sincerely,

DAMES & MOORE, INC.

Perry W. Fisher, Ph.D.
Principal
Certified Consulting Meteorologist
Qualified Environmental Professional

PWF:ng

[d\...\job\14775004\rock1019.rpt]

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

JAN 11 1990

RECEIVED
JAN 16 1990
BUREAU OF
AIR MANAGEMENT

Joseph G. Brisch
Executive Vice-President
Rockwell Lime Company
4223 Rockwood Road
Manitowoc, Wisconsin 54220-9619

Re: Rockwood Plant
Lime Kiln No. 2

Dear Mr. Brisch:

On November 20, 1989, the United States Environmental Protection Agency (U.S. EPA) sent a letter requesting that you provide certain information and conduct a stack test to determine the sulfur dioxide emission rate for lime kiln No. 2. On December 12, 1989, representatives of your Company met with my staff in regard to the Notice of Violation that was issued to Rockwell Lime Company on November 7, 1989. At the meeting, U.S. EPA was presented with information indicating that Rockwell Lime Company has stopped using noncompliant fuel for lime kiln No. 2, and currently is in compliance with the limit specified by its Permit to Construct. Therefore, U.S. EPA has determined that it is not necessary for you to perform the stack test at this time. However, to substantiate that Rockwell Lime Company will continue to use compliant fuel, you are hereby required, under the authority of Section 114 of the Clean Air Act (a copy of which is enclosed), to perform fuel sampling and analysis, and to provide such information to U.S. EPA in the manner indicated below:

1) Within 30 days of receipt of this letter, and continuing for 6 months thereafter, Rockwell Lime Company shall conduct monthly fuel sampling and analysis on each type of solid fuel used at lime kiln No. 2. Sampling and analysis shall be performed on an as fired basis and in accordance with ASTM, Part 26.

2) Within 60 days of receipt of this letter, and continuing for 6 months thereafter, Rockwell Lime Company shall submit monthly reports to U.S. EPA documenting the results of the sampling and analysis requested above. Additionally, each report shall include the following information:

   a) Date sample taken.
   b) Date sample analyzed.
   c) Identification of the person(s) or laboratory conducting the tests.
   d) Type of each fuel burned for the month.
   e) Amount of each fuel burned for the month.

f) Source and supplier of each fuel.
g) Date and amount of usage for any fuel containing more than 2.1 percent sulfur by weight on an as fired basis, and the amount and sulfur content of other fuels used on the same day.

The information required by this letter shall be submitted to Mr. Larry F. Kertcher, Chief, Air Compliance Branch, Region V, U.S. EPA, 230 South Dearborn Street, Chicago, Illinois 60604. A copy of the information reply should also be sent to Mr. Donald F. Theiler, Director, Bureau of Air Management, Wisconsin Department of Natural Resources, 101 S. Webster Street, P.O. Box 7921, Madison, Wisconsin 53707.

Please be advised that U.S. EPA has the authority to use the information requested herein in an administrative, civil, or criminal action.

Pursuant to regulations appearing at 40 CFR Section 2.100 et seq., (41 F.R. 36902), you are entitled to assert a business confidentiality claim covering any portion of the submitted information which is not emission data or necessary to determine emission data. Failure to assert such a claim makes the submitted information available to the public without further notice. Information subject to a business confidentiality claim may be available to the public only to the extent set forth in the above-cited regulations.

Any questions concerning this request may be directed to Mr. Farro Assadi, of my staff, who may be contacted at (312) 353-2086.

Your cooperation in providing this information is appreciated.

Sincerely yours,

David Kee, Director
Air and Radiation Division (5AC-26)

Enclosure

cc: Donald F. Theiler, Director
Bureau of Air Management

411 East Wisconsin Avenue
Milwaukee, Wisconsin 53202-4497
414/277-5000
FAX 414/277-5591

Attorneys at Law in
Milwaukee and Madison, Wisconsin
West Palm Beach and Naples, Florida
Phoenix, Arizona

Quarles & Brady

January 5, 1990

Mr. Donald F. Theiler
Director, Bureau of Air Management
Wisconsin DNR
P.O. Box 7921
Madison WI 53701-7921

Re: Rockwell Lime Company
Rockwood, Wisconsin

Dear Mr. Theiler:

This letter will provide you with a status report regarding the November 7, 1989 Notice of Violation issued by U.S. EPA Region V to Rockwell Lime Company. EPA's notice alleged violation of a condition contained in a PSD permit issued to the Company in 1979 for the construction and operation of a rotary lime kiln (kiln no. 2). The subject condition imposes a 2.1% sulfur content limitation on fuel used to fire the kiln.

On December 12, 1989, an enforcement conference was held at EPA's offices in Chicago concerning this matter. The Company informed EPA that it is in compliance with the terms and conditions of the permit by utilizing a blend of fuel to fire rotary kiln no. 2 which meets the 2.1% sulfur content limitation. The Company has been utilizing the compliance fuel blend since August of 1989, when the Company was first informed by telephone by EPA of the alleged permit violation.

At the December 12 meeting in Chicago, the Company also provided EPA with information responsive to EPA's Request for Information dated November 20, 1989. We are enclosing herewith copies of the documents which were provided to EPA. This information responds to Items 2 and 3 of EPA's Request for Information. On December 12, EPA indicated that the Company will not be required to perform the stack test requested in Item 1 of EPA's November 20, 1989 letter.

At the conclusion of the December 12 meeting, EPA indicated that it would consider the information presented to it at the meeting. EPA stated that it was pleased with the prompt action taken by the Company to achieve compliance in this matter. It is likely that EPA will require sampling of the fuel utilized in kiln no. 2 on a routine basis and notification to EPA and DNR anytime there is a change in the fuel supplier. EPA indicated

that the Company is now in compliance with the permit limitations and that no further enforcement action would be taken. The Company expects to receive a letter from EPA confirming the above position in the near future.

Please feel free to contact us if you have any questions or comments concerning this matter.

Very truly yours,

QUARLES & BRADY

Michael S. McCauley

225:lr
Enclosures
cc: Mr. Donald R. Brisch
Vice President of Operations
Rockwell Lime Company
Mr. Mike DeBrock
DNR - Green Bay

APPENDIX A

FEDERAL PSD PERMIT

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

SEP 27 1979

Mr. Joseph G. Brisch
Executive Vice President
Rockwell Lime Company
Route 2, Box 124
Manitowoc, Wisconsin 54220

Re: Rockwell Lime Company
Rotary Lime Kiln No. 2
Kossuth Township, Wisconsin

Dear Mr. Brisch:

We have completed our final review of Rockwell Lime Company's application for approval to construct a new rotary lime kiln No. 2 in Kossuth Township, Wisconsin.

A determination to approve with conditions, the construction of a new rotary lime kiln No. 2, has been made. There were no public comments and no request for a public hearing submitted concerning the preliminary approval of the lime kiln by the U.S. Environmental Protection Agency (U.S. EPA). The approval to construct which delineates the required conditions of construction and operation is enclosed. Please be advised that this approval is based upon your written application; any departure from the terms in the application must receive the prior written authorization from U.S. EPA.

I would like to stress that this approval only applies to the regulations contained in 40 CFR 52.21 concerning the Prevention of Significant Deterioration of Air Quality and the applicable sections of the Clean Air Act, as amended. This approval in no way relieves Rockwell Lime Company of the responsibility to comply fully with all the other requirements of the Clean Air Act, Clean Water Act or any other Federal, State and local environmental legislation.

In addition, the United States Court of Appeals for the D.C. Circuit has issued a ruling in the case of the Alabama Power Co. vs. Douglas M. Costle (78-1006 and consolidated cases) which has significant impact on the EPA Prevention of Significant Deterioration (PSD) program and approvals issued thereunder. Although the court has stayed its decision pending resolution of petitions for reconsideration, it is possible that the final decision will require modification of the PSD regulations and could affect approvals

issued under the existing program. Examples of potential impact areas include the scope of best available control technology (BACT), source applicability, the amount of increment available (baseline definition), and the extent of preconstruction monitoring that a source may be required to perform. The applicant is hereby advised that this approval may be subject to reevaluation as a result of the final court decision and its ultimate effect.

I appreciate your cooperation and that of your firm in this matter.

Sincerely yours,

John McGuire
Regional Administrator

Enclosures

cc: Robert Arnott, Ph.D., Director
Bureau of Air Pollution Control
Wisconsin Department of Natural Resources

Rosemary Singh
Manitowoc Public Library
Reference Section

In the Matter of	)	Approval to Construct
	)	
Rockwell Lime Company Kossuth Township, Wisconsin	)	EPA-5-A-79
	)	
Proceeding Pursuant to the Clean Air Act, as amended	)	

Authority

The approval to construct is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., (the Act), and the Federal regulations promulgated thereunder 40 CFR 52.21 for the Prevention of Significant Deterioration of Air Quality (PSD).

Findings

1. The Rockwell Lime Company (Rockwell) proposes to construct a new rotary lime kiln (kiln No. 2) in Kossuth Township, Wisconsin.

2. The proposed construction of the new rotary lime kiln is subject to the requirements of 40 CFR 52.21 and the applicable sections of the Act.

3. On December 12, 1978, Rockwell submitted a PSD application. The application was determined to be deficient on January 18, 1979. On February 19,1979, additional information was submitted. The application was determined to be complete and preliminary approval was granted on April 5, 1979. On May 4, 1979, notice was published in the Herald-Times Reporter seeking comments from the public and giving an opportunity to request a public hearing on the application and U.S. EPA's review and preliminary determination to approve construction of the above-cited source. No comments or requests for a public hearing were received.

4. After a thorough review of all materials submitted by Rockwell, U.S. EPA has determined that emissions from the new rotary kiln will not violate the National Ambient Air Quality Standards nor will it violate the PSD air quality increments. The operation of the proposed lime kiln will be controlled by the application of the best available control technology (BACT).

5. A baghouse will be utilized to control particulate emissions from the kiln's exhaust gases. Fugitive particulate emissions from the kiln will be minimal. The coal will be unloaded into hoppers and conveyed underground to the main building. The lime will be transported by sealed screw conveyors to a sealed storage area.

6. The lime in the kiln and baghouse will absorb sulfur dioxide. In addition, a low sulfur coal with a maximum sulfur content of 1 percent will be used. If a low sulfur coal is not available a medium sulfur coal with a sulfur content not greater than 2.1 percent will be used.

7. The lime kiln is subject to the requirements of 40 CFR Part 60, Subpart HH, New Source Performance Standards for Lime Manufacturing Plants.

Conditions

8. Emissions of particulate matter from the baghouse shall not exceed 0.30 pounds per ton of limestone feed.

9. Fugitive particulate matter emissions shall not exceed 5% opacity from any of the following sources:

a. Limestone conveying and storage
b. Coal unloading and conveying
c. Lime conveying and storage

10. The sulfur content of the coal used to fire the kiln shall not exceed 2.1 percent on a 24-hour basis.

11. The exhaust gases from the baghouse shall not exceed 10% opacity.

Conditions 8 through 11 represent the application of BACT as required by Section 165 of the Act.

12. In accordance with 40 CFR Section 60.7 (c) and 60.343 (e), quarterly reports of all six-minute periods during which the average opacity of the plume is 10 percent or greater shall be submitted to U.S. EPA within 5 days of each occurrence.

Approval

13. This approval to construct does not relieve Rockwell of the responsibility to comply with the control strategy and all local, State and Federal regulations which are part of the applicable Implementation Plan, as well as all other applicable local, State and Federal requirements.

14. This approval is effective immediately. This approval to construct shall become invalid, if construction or expansion is not commenced within 18 months after receipt of this approval or if construction is discontinued for a period of 18 months or more. The Administrator may

extend such time period upon a satisfactory showing that an extension is justified. Written notification shall be made to U.S. EPA 5 days after construction is commenced.

15. A copy of this approval has been forwarded for public inspection to the Manitowoc Public Library, 808 Hamilton, Manitowoc, Wisconsin.

16. In addition, the United States Court of Appeals for the D.C. Circuit has issued a ruling in the case of Alabama Power Co. vs. Douglas M. Costle (78-1006 and consolidated cases) which has significant impact on the EPA Prevention of Significant Deterioration (PSD) program and approvals issued thereunder. Although the court has stayed its decision pending resolution of petitions for reconsideration, it is possible that the final decision will require modification of the PSD regulations and could affect approval issued under the existing program. Examples of potential impact areas include the scope of best available control technology (BACT), source applicability, the amount of increment available (baseline definition), and the extent of preconstruction monitoring that a source may be required to perform. The applicant is hereby advised that this approval may be subject to reevaluation as a result of the final court decision and its ultimate effect.

9-27-79
Date

Regional Administrator

APPENDIX B

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
PERMIT APPLICATION FORMS

State of Wisconsin
Department of Natural Resources

FACILITY AND PROJECT IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Section 144.391, Wisconsin Statutes
Form 4500-1A Rev.12-86

1. Facility Mailing Address:
Name
Rockwell Lime Company

Street or Route
4110 Rockwood Road

City, State, Zip Code
Manitowoc, Wisconsin 54220

2. Facility Location:
Street or Route
Rockwood Road

City
Rockwood

County
Manitowoc

3. Nature of Business, SIC Code, and Facility Identification Number
Lime Manufacturing, SIC Code 3274

4. Parent Corporation:
Name
None

Street

City, State, Zip Code

5. Air Pollution Contact at Facility:
Name
Donald Brisch

Title
Vice President, Operations

Telephone Number (Include Area Code and Extension)
(414) 682-7771

6. Individual to whom the permit(s) should be issued - Name
Donald Brisch

Title
Vice President, Operations

Telephone Number (Include Extension and Area Code)
(414) 682-7771

7. Attach a plot plan of this facility which identifies the location of surrounding streets, facility property boundaries, the air pollution source(s) to be permitted and any stacks or vents exhausting the source(s), facility buildings and their respective exterior dimensions. Include any roads, parking lots or outdoor storage piles associated with the source(s) to be permitted. use Form 4500-1F, Facility Plot Plan, or an equivalent format for this purpose.
S

8. Type of Air Permit Desired (check ✓ one)

[ ] Construction of a new source
[ ] Modification of an existing source
[ ] Reconstruction of an existing source
[ ] Relocation of an existing source
[ ] Replacement of an existing source
[ ] Existing source mandatory operating permit
[x] Alteration of an existing permit
[ ] Elective operation permit

9. Briefly describe proposed project or existing source(s) to be permitted:

This application proposes to amend the federal PSD permit which was issued previously by Region 5 of USEPA on September 27, 1979. The amendment would allow Kiln No. 2 to burn a fuel blend of gas, coal and petroleum coke to produce dolomitic lime. The fuel blend would retain the emission limitation of 2.1% sulfur content, and thus, the proposed amendment would cause no increase in emissions or ambient impact.

WDNR is authorized to approve the amendment under a delegation of authority from Region 5. The amendment is administrative. Its approval would be based on the permit modification policy which is implemented by Region 5 and delegated to WDNR.

10. Anticipated Date of Construction
N/A

11. I, the undersigned, certify that the information submitted in this application is to the best of my knowledge both true and accurate.

Signature	Title	Date Signed

State of Wisconsin
Department of Natural Resources

FACILITY AND PROJECT IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Section 144.391, Wisconsin Statutes
Form 4500-1A Rev.12-86

1. Facility Mailing Address: Name **Rockwell Lime Company**	2. Facility Location: Street or Route **Rockwood Road**
Street or Route **4110 Rockwood Road**	City **Rockwood**
City, State, Zip Code **Manitowoc, Wisconsin 54220**	County **Manitowoc**

3. Nature of Business, SIC Code, and Facility Identification Number
Lime Manufacturing, SIC Code 3274

4. Parent Corporation: Name **None**	5. Air Pollution Contact at Facility: Name **Donald Brisch**
Street	Title **Vice President, Operations**
City, State, Zip Code	Telephone Number (Include Area Code and Extension) **(414) 682-7771**
6. Individual to whom the permit(s) should be issued - Name **Donald Brisch**	7. Attach a plot plan of this facility which identifies the location of surrounding streets, facility property boundaries, the air pollution source(s) to be permitted and any stacks or vents exhausting the source(s), facility buildings and their respective exterior dimensions. Include any roads, parking lots or outdoor storage piles associated with the source(s) to be permitted. use Form 4500-1F, Facility Plot Plan, or an equivalent format for this purpose. **S**
Title **Vice President, Operations**	
Telephone Number (Include Extension and Area Code) **(414) 682-7771**	

8. Type of Air Permit Desired (check✓ one)

[ ] Construction of a new source	[ ] Replacement of an existing source
[ ] Modification of an existing source	[ ] Existing source mandatory operating permit
[ ] Reconstruction of an existing source	[x] Alteration of an existing permit
[ ] Relocation of an existing source	[ ] Elective operation permit

9. Briefly describe proposed project or existing source(s) to be permitted:

This application proposes to amend the federal PSD permit which was issued previously by Region 5 of USEPA on September 27, 1979. The amendment would allow Kiln No. 2 to burn a fuel blend of gas, coal and petroleum coke to produce dolomitic lime. The fuel blend would retain the emission limitation of 2.1% sulfur content, and thus, the proposed amendment would cause no increase in emissions or ambient impact.

WDNR is authorized to approve the amendment under a delegation of authority from Region 5. The amendment is administrative. Its approval would be based on the permit modification policy which is implemented by Region 5 and delegated to WDNR.

10. Anticipated Date of Construction
N/A

11. I, the undersigned, certify that the information submitted in this application is to the best of my knowledge both true and accurate.

Signature	Title	Date Signed

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Section 144.391, Wisconsin Statutes
Form 4500-1S Rev.12-86

State of Wisconsin
Department of Natural Resources

1. Facility Name **Rockwell Lime Company**

2. This data is for stack **#S-11**

3. Exhausting Source(s) (Use # from appropriate Form 4500-1B, 1C, 1D, 1I, 1P, AND/OR 1T.)

#B **#D** **#P-36**

#C **#I** **#T**

4. Discharge height above ground level **77** (feet)

5. Inside dimensions at outlet (check✓ one and complete)

[x] Circular diameter **6** (feet)

[ ] Rectangular L.(feet) W. (feet)

6. Exhaust Flow Rate
Normal (ACFM) Maximum **69,107** (ACFM)

7. Exhaust Gas Temperature
Normal (°F) Maximum **500** (°F)

8. Moisture Content
Normal (%) Maximum (%)

9. Discharge Direction (check✓ one)
[x] Up [ ] Down [ ] Horizontal

10. Identify this stack on the plot plan required on Form 4500-1A.

11. Material from which this stack is constructed (e.g. carbon steel, stainless steel, masonry, fiberglass, etc.) and its thickness.
Carbon Steel

12. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? (check✓ one)
[ ] Yes [x] No

13. Is this stack equipped with sampling ports for stack testing purposes? (check✓ one)
[x] Yes [ ] No

14. Is this stack equipped with continuous monitoring equipment? (check✓ one)

[x] Yes [ ] No **Opacity**

If yes, what pollutant(s) does this equipment monitor (e.g. TRS, NO_x, SO_2, O_2, Opacity, etc.)

Attach a description of this equipment, including the manufacturer, model number, and diagram showing its location on the stack.

15. Complete the following emissions table if adequate data is available, by:

A. Indicating the source(s) exhausting to this stack; (use numbers from appropriate Form 4500-1B, 4500-1C, 4500-1D, 4500-1I, 4500-1P, or 4500-1T.)

B. Checking the emission units used for each pollutant, lbs/hr, or actual ppm;

C. Providing the emissions for each source operating at maximum capacity;

D. Providing % of total stack gas flow rate contributed by each source;

E. And attaching sufficient documentation to verify the stated emissions data, such as references used, stack tests on similar sources, or supporting calculations including any emission factors used to estimate emissions.

Pollutant	Check Emission Units	Source P36	Source	Source
Particulates	[x] lbs/hr [ ] ppm	7.44		
Sulfur Dioxide	[x] lbs/hr [ ] ppm	148.54		
Nitrogen Oxides	[x] lbs/hr [ ] ppm	35.0		
Carbon Monoxide	[x] lbs/hr [ ] ppm	25.0		
Organic Compounds	[x] lbs/hr [ ] ppm	0.25		
Lead	[ ] lbs/hr [ ] ppm			
Other (specify)	[ ] lbs/hr [ ] ppm			
% of total stack gas flow rate from this source				

16. Complete the appropriate Air Permit Application Form(s) 4500-1B, 4500-1C, 4500-1D, 4500-1I, 4500-1P, or 4500-1T for each source exhausting through this stack.

State of Wisconsin
Department of Natural Resources

MISCELLANEOUS PROCESSES
AIR POLLUTION CONTROL PERMIT APPLICATION
Section 144.391, Wisconsin Statutes
Form 4500-1P Rev.12-86

1. Facility Name

Rockwell Lime Company

2. This data is for process form #P-36, **Kiln #2**

3. Which exhausts through stack(s) #S-**11**
(use # from appropriate Form 4500-1S.)

4. and has its emissions reduced by control device

#C-**017**
(use # from appropriate Form 4500-1C.)

5. Describe this process

Kiln #2 produces dolomitic lime from limestone by calcination.

6. Attach a flow diagram of this process identifying major pieces of equipment, pick-up points for dusts, fumes and vapors, emissions control devices, exhaust stacks or vents, where raw materials will enter the process and finished product will exit. If an existing process is being modified, indicate any new components which will augment this process.

7. Normal operating schedule of this process

24 hrs/day **7** days/week **365** days/yr

8. Provide the approximate amounts of raw materials consumed by this process, describing storage and handling procedures.

Limestone = 25.0 tph

Coal = 3.54 tph

Fuel Blend = 3.18 tph

9. Describe the finished product(s) including storage and handling procedures

Lime = 12.5 tph

10. Process Flow Rate (check✓ appropriate item)

A. [ ] Batch Process

Maximum lbs raw materials/batch

Maximum lbs finished product/batch

Maximum batches/hr

Maximum batches/day

B. [x] Continuous Process

50,000 Maximum lbs raw material/hr

25,000 Maximum lbs finished product/hr

11. Process Fuel Usage

A. Specify all fuels used by this process and the expected daily and annual usage of each fuel.
Coal = 85 tpd
Fuel Blend = 76.32 tpd

B. Maximum heat input **85.0** (million BTU per hour)

C. For fuels other than natural gas, propane, or #2 fuel oil, provide the information required under Items 10,11, and 12 on Form 4500-1B, as appropriate.

12. Describe the size and location of any sources of fugitive emissions which will serve this process such as outdoor storage piles, unpaved roads, open conveyors, etc.
None

13. Complete Form(s) 4500-1S for all stacks exhausting this process.

14. Complete Form(s) 4500-1C for all control devices reducing emissions from this process.

State of Wisconsin
Department of Natural Resources

CONTROL EQUIPMENT
AIR POLLUTION CONTROL PERMIT APPLICATION
Section 144.391, Wisconsin Statutes
Form 4500-1C Rev. 12-86

1. Facility Name **Rockwell Lime Company**

2. This data is for control equipment **#C-017,**

3. Which will exhaust through stack(s) **#S-11,** (Use # from appropriate Form 4500-1S.)

4. And will reduce emissions from source(s) (Use # from appropriate Form 4500-1B, 1D, 1I, 1P, or 1T.)

#B **#I** **#T**

#D **#P-36**

5. Type of control equipment (check ✓ appropriate item and provide the specification identified in the instructions on the back).

[ ] Settling Chamber
[ ] Cyclone
[ ] Multiple-Cyclone
[ ] Filter(s)
[ ] Electrostatic Precipitator
[x] Baghouse
[ ] Scrubber (specify)
[ ] Adsorption
[ ] Condensation (specify)
[ ] Incineration
[ ] Water Wall
[ ] Other (specify)

6. Attach a blueprint or diagram of this equipment.

7. Manufacturer and model number

8. Operating pressure drop range (inches w.g.)

9. Maximum inlet gas flow rate (ACFM)
69,107

10. Maximum inlet gas temperature (°F)
500 °F

11. List pollutant(s) to be controlled by this equipment and the expected control efficiency for each pollutant.

Pollutant	Inlet Pollutant Concentration (gr/acf or ppm)	Hood Capture efficiency (%), if appropriate	Efficiency (%)
PM_{10} and TSP			**99.83**

12. Attach sufficient documentation to verify the stated capture and control efficiency for this equipment. This may include actual design calculations or emission test verifying the effectiveness of this equipment for this specific air pollution control application. Provide equipment performance guarantees, if available.

13. Attach a malfunction prevention and abatement plan for this equipment.

This plan should include:

A. An identification of the individual(s), by name and title, responsible for inspecting, maintaining and repairing the air pollution control device.

B. The maximum intervals for inspection and routine maintenance.

C. A description of the items or conditions that will be inspected.

D. A listing of materials and spare parts that will be maintained in inventory.

E. An identification of the source and air pollution control equipment operation variables that will be monitored in order to detect a malfunction or failure; the correct operating range of these variables; and a description of the method of monitoring or surveillance procedures or a reference to specific pages containing this information in manuals or other documents kept by the owner or operator.

14. Discuss how collected effluent will be handled for reuse or disposal.

Solid waste will be disposed through licensed contractor.

ROCKWELL LIME COMPANY

4110 Rockwood Road
Manitowoc, WI 54220
414-682-7771
Fax: 414-682-7972

fax transmittal

to: Mr. Raj Vakharia, Review Engineer

fax: (608) 267-0560

from: Don Brisch

date: October 18, 1994

re: Sulfur Compliance

pages: 2

NOTES:

ROCKWELL lime company
4110 Rockwood Rd. Manitowoc, Wisconsin 54220-9619
Local - 414-682-7771
Watts - 1-800-558-7711
Fax - 414-682-7972

October 18, 1994

Mr. Raj Vakharia, Review Engineer
Wis. Dept. of Natural Resources
Bureau of Air Management
P.O. Box 7921
Madison, WI 53707

Dear Mr. Vakharia:

I would like to recommend that the following method be used by Rockwell Lime Company to show compliance with the 2.1% sulfur content of the fuel blend (natural gas, coal and coke) as used in kiln No. 2 and under the proposed permit revision.

- 12,500 BTU/lb of coal (Industry Average)
- 2.1% sulfur limit on coal per Federal Permit No. EPA-5-A-79

Based on the above information,

- 80 lbs coal/MMBTUs
- 1.68 lbs of sulfur/MMBTUs

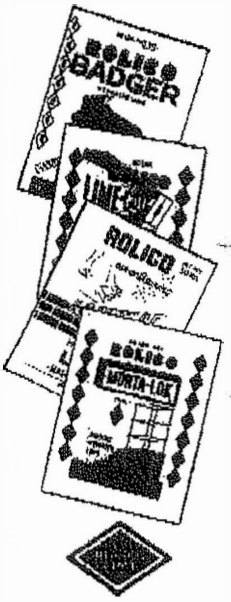
I would suggest that we use 1.68 lbs of sulfur/MMBTUs as our maximum limit as determined by a 24-hour average. This would result in a very simple method for recording and showing compliance.

Raj, if you have any questions please feel free to contact me at (414) 682-7771.

Sincerely,

ROCKWELL LIME COMPANY

Donald R. Brisch
President



TIGER AIRO
TIGER JIFFI SOAK

Manufacturers of
MORTA-LOK (Type S Masonry) • E-Z SPREAD A/E (Type S Masonry Stucco) • LIME COTE (Type S Finishing) • BADGER (Type N)

Rockwell Lime Company
4110 Rockwood Road
Manitowoc, WI 54220
(414) 682-7771
Fax: (414) 682-7972

fax transmittal

to: Mr. Raj Vakharia

fax: (608) 267-0560

from: Don Brisch

date: November 4, 1994

re: Sulfur #'s/MMBtu Equation

pages: 2, including cover sheet.

NOTES:

Raj,

Please consider the following equation:

$$\frac{(F_{NG}\times S_{NG})+(F_C\times S_C)+(F_{PC}\times S_{PC})+(F_B\times S_B)}{H_T}\leq 1.56$$

F_{NG} = Amount of Natural Gas Used (CF)
S_{NG} = Lbs of Sulfur/CF
F_C = Amount of Coal Used (Lbs)
S_C = % Sulfur - Coal
F_{PC} = Amount of Petroleum Coke Used (Lbs)
S_{PC} = % Sulfur - Petroleum Coke
F_B = Amount of Coal/Pet. Coke Blend Used (Lbs)
S_B = % Sulfur - Coal/Coke Blend
H_T = Total MMBtu Input of All Fuels Used

Thanks,

Rockwell Lime Company - Summary of Reported Pet. Coke/Coal Blend Data

Quarter/Year	Sulfur Content, wt%	Heat Content, BTU/lb	# Sulfur/MMBTU
2/94	1.74	13173	1.321
1/94	1.75	12980	1.348
4/93	1.68	13511	1.243
3/93	1.62	13717	1.181
2/93	2.04	14011	1.456
1/93	2.05	14257	1.438
4/92	1.71	13848	1.235
3/92	1.83	13674	1.338
Average	1.80	13646	1.320

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To Raj Vakharia	From Eileen Ingwersen
Co. WDNR	Co. WDNR
Dept. Air mgmt	Phone # 492-5858
Fax #	Fax #

Rockwell Lime Company
4110 Rockwood Road
Manitowoc, WI 54220
(414) 682-7771
Fax: (414) 682-7972

fax transmittal

to:	Mr. Raj Vakharia
fax:	(608) 267-0560
from:	Don Brisch
date:	November 1, 1994
re:	Draft of Final Permit
pages:	3, including cover sheet.

NOTES:

&

ROCKWELL lime company
4110 Rockwood Rd. Manitowoc, Wisconsin 54220-9619
Local - 414-682-7771
Watts - 1-800-558-7711
Fax - 414-682-7972

November 1, 1994

Mr. Raj Vakharia, Review Engineer
Wis. Department of Natural Resources
Bureau of Air Management
P.O. Box 7921
Madison, WI 53707

Dear Mr. Vakharia:

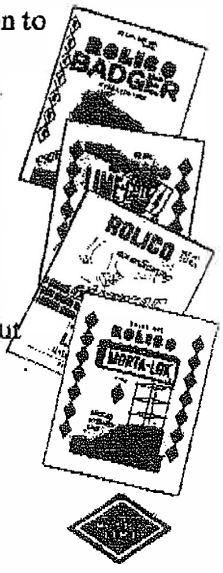
After careful review of your "Draft Final Permit" dated October 28, 1994, I have found several concerns I would like to address:

1.) Under Note 2, you do not include the use of natural gas. In my permit application under section 9 it clearly states that natural gas should be considered part of the fuel blend. "The amendment would allow Kiln No.2 to burn a **fuel blend** of **gas, coal and petroleum coke** to produce dolomitic lime. The **fuel blend** would retain the emission limitation of 2.1% sulfur content, and thus, the proposed amendment would cause no increase in emissions or ambient impact." I would suggest that Note 2 be rewritten as follows:

BACT has been determined to be the use of fuel blend (natural gas, coal, coke) having a sulfur content of 1.56 pounds sulfur/mmBtu, as determined by a 24-hour average. The permittee shall use the following equation to show compliance with the BACT limitation:

$$\sum_{1}^{n} (X)_n \leq 1.56$$

Where: n = number of fuels
X = pounds sulfur from fuel n divided by the heat input from fuel n in mmBtu, on a 24 hour average basis.



2.) Under section 2 "Other Conditions" paragraph "e", I do not understand the need to record opacity (CEM data) and pressure drop across each module of the baghouse, during a stack test. Recording opacity during a stack test would be very difficult, since the opacity monitor is removed in order to install the instrumentation needed to conduct the particulate emission test. The pressure drop requirement should be changed to require the recording of the baghouse inlet pressure as prescribed in section 2 "Other Conditions" paragraph "c".

3.) Section 2 "Other Conditions" paragraph "i" should be revised to read the same as Note 2 above:

> BACT has been determined to be the use of fuel blend (natural gas, coal, coke) having a sulfur content of 1.56 pounds sulfur/mmBtu, as determined by a 24-hour average. The permittee shall use the following equation to show compliance with the BACT limitation:
>
> $$\sum_{1}^{n} (X)_n \leq 1.56$$
>
> Where: n = number of fuels
> X = pounds sulfur from fuel n divided by the heat input from fuel n in mmBtu, on a 24 hour average basis.
>
> The permittee shall test for the heat content and % sulfur by weight of the solid fuels on a "as received" basis and shall comply with the fuel sampling, analysis and reporting requirements per sec. NR 439.085, Wis. Adm. Code.

Raj, if you have any questions or feel that a meeting would be helpful in resolving these issues, please feel free to contact me at (414) 682-7771.

Sincerely,

ROCKWELL LIME COMPANY

Donald R. Brisch
President

Rockwell Lime Company
4110 Rockwood Road
Manitowoc, WI 54220
(414) 682-7771
Fax: (414) 682-7972

fax transmittal

to:	Mr. Raj Vakharia
fax:	(608) 267-0560
from:	Don Brisch
date:	October 27, 1994
re:	Lbs. Sulfur/MMBTU
pages:	1, including cover sheet.

NOTES:

Raj,

I used the following formula to calculate lbs. of sulfur/MMBtu:

Coal-Coke Btu/lb value as received: 13,432 - May 1, 1994 Sample
Sulfur limit: 2.1% by weight

1,000,000 Btu / 13,432 Btu/lb = 74.45 lbs. Coal-Coke Blend/MMBtu
2.1% x 74.45 = 1.56 lbs Sulfur/MMBtu.

If you have any questions, please feel free to call me.

Rockwell Lime Company
4110 Rockwood Road
Manitowoc, WI 54220
(414) 682-7771
Fax: (414) 682-7972

fax transmittal

to: Mr. Raj Vakharia

fax: (608) 267-0560

from: Don Brisch

date: October 27, 1994

re: Lbs. Sulfur/MMBTU

pages: 1, including cover sheet.

NOTES:

Raj,

I used the following formula to calculate lbs. of sulfur/MMBtu:

Coal-Coke Btu/lb value as received: 13,432 - May 1, 1994 Sample
Sulfur limit: 2.1% by weight

1,000,000 Btu / 13,432 Btu/lb = 74.45 lbs. Coal-Coke Blend/MMBtu
2.1% x 74.45 = 1.56 lbs Sulfur/MMBtu.

If you have any questions, please feel free to call me.

State of Wisconsin\DEPARTMENT OF NATURAL RESOURCES
Lake Michigan District Headquarters
1125 N. Military Avenue
P.O. Box 10448
Green Bay, Wisconsin 54307-0448

Telephone #: 414-492-5800
Telefax #: 414-492-5913
TDD #: 414-492-5812

FAX Message

Date: 10-19-94
To: Raj Vakharia
Company: WDNR - Air mgt. AM/7
Fax Phone Number:

From: Eileen Ingwersen

Subject:
# of Pages (including this cover sheet):

Message:

This is the analysis for the 2nd quarter of 94. The sample was collected off the stockpile 'as received'. Prior ~~~~ samples were collected 'as fired'.

Don would be willing to accept a #S/mmBTU limit based on this sample's heat content of 13432 BTU/lb, and ~~~~ is willing to do all future sampling truly 'as received'. Is this what we want? 1.57 lb S/mmBTU

E

If you do not receive all pages, please call back immediately.
(Connie Schramm at 414-492-5809)

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 127, SOUTH HOLLAND, IL 60473
TEL: (708) 331-2900
FAX: (708) 333-3060

June 17, 1994

ROCKWELL LIME COMPANY
4110 ROCKWOOD ROAD
MANITWOC, WI 54220
ATTN: Don Brisch

Sample identification by
Rockwell Lime Co.

Kind of sample reported to us	Coal/Petroleum Coke Blend	Sample No. #SP1
Sample taken at	Stock Pile	
Sample taken by	John Zucchi	
Date sampled	May 1, 1994	
Date received	June 10, 1994	P.O. No. VERBAL DON

Analysis Report No. 71-75984 Page 1 of 1

PROXIMATE ANALYSIS

	As Received	Dry Basis	
% Moisture	6.70	xxxxx	
% Ash	4.18	4.48	
% Volatile	29.15	31.24	
% Fixed Carbon	59.97	64.28	
	100.00	100.00	
Btu/lb	13432	14397	MAF 15072
% Sulfur	1.31	1.40	

HARDGROVE GRINDABILITY INDEX = 45 @ 2.15 % Moisture

METHODS
Moisture: ASTM D 3302; Ash: ASTM D 3174; Volatile: ASTM D 3175; Fixed Carbon: Calculated Value; ASTM D 3172
Btu/lb: ASTM D 3286; Sulfur: ASTM D 4239 (Method C); Hardgrove Grindability Index: ASTM D 409

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

State of Wisconsin\DEPARTMENT OF NATURAL RESOURCES
Lake Michigan District Headquarters
1125 N. Military Avenue
P.O. Box 10448
Green Bay, Wisconsin 54307-0448

Telephone #: 414-492-5800
Telefax #: 414-492-5913
TDD #: 414-492-5812

FAX Message

Date: 10-18-94
To: Raj Vakharia
Company: WDNR Air Mgmt AM/7
Fax Phone Number:
From: Eiken Ingwersen
Subject: Rockwell Lime
# of Pages (including this cover sheet): 3

Message:

worst case — highest heat content pet. coke/coal blend, attached.

Note the low moisture content of the "as received" blend.

Don claims the actual "as received" moisture content is 6.5%. But he has no data to back this up.

If you do not receive all pages, please call back immediately.
(Connie Schramm at 414-492-5809)

ROCKWELL lime company
4110 Rockwood Rd. Manitowoc, Wisconsin 54220-9619
Local - 414-682-7771
Watts - 1-800-558-7711
Fax - 414-682-7972

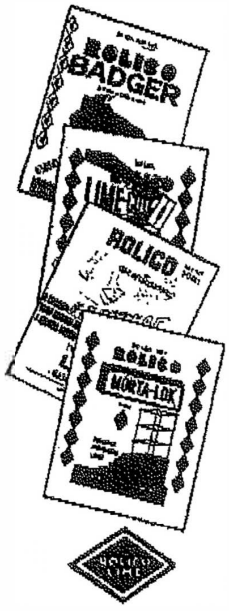
COAL/PET. COKE ANALYSIS
1ST. QUARTER 1993

Period Covered: 01/01/93 Thru 03/31/93

Average Sulfur Content: 2.05%

Average BTU/lb: ~~14,527~~ ~~[illegible]~~ 14257

Total Amount Used (Tons): 5,152



COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
18130 VAN DRUNEN RD., P.O. BOX 127
SOUTH HOLLAND, IL 60473
TELEPHONE: (708) 331-2900
TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

January 8, 1993

ROCKWELL LIME COMPANY
4110 ROCKWOOD RD
MANITWOC, WI 54220
ATTN: Don Brisch

Sample identification by
Rockwell Lime Co.

Kind of sample reported to us: Coal/Coke Blend

Sample ID: Coal/Petroleum Coke

Sample taken at: -----

Sample taken by: Rockwell Lime Co.

Date sampled: ------

P.O. No. 1864

Date received: January 6, 1993

Analysis Report No. 71-48086 Page 1 of 1

PROXIMATE ANALYSIS

	As Received	Dry Basis	
% Moisture	1.32	xxxxx	
% Ash	4.73	4.79	
% Volatile	27.13	27.49	
% Fixed Carbon	66.82	67.72	
	100.00	100.00	
Btu/lb.	14257	14448	MAF 15175
% Sulfur	1.84	1.86	

METHODS: Moisture per ASTM Designation D 3173
Ash per ASTM Designation D 3174
Volatile per ASTM Designation D 3175
Btu per ASTM Designation D 2015 or 3286
Sulfur per ASTM Designation D 4239 (Method C)
Fixed Carbon (Calculated Value) is the resultant of the summation of percentage moisture, ash, and volatile matter. subtracted from 100.

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

WISCONSIN
DEPT. OF NATURAL RESOURCES

George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
TELEPHONE 608-266-2621
TELEFAX 608-267-3579
TDD 608-267-6897
AIR MGMT FAX 608-267-0560

December 20, 1994

File Code: 4560
FID #: 436034390

Mr. Gary Gulezian
Chief, Air & Radiation Branch
U.S. EPA, Region V
77 West Jackson Blvd
Chicago, IL 60604

SUBJECT: Rockwell Lime Company
Revision of Federal PSD Permit No. EPA-5-79.

Dear Mr. Gulezian:

The Department is in the process of revising the federal PSD permit for kiln No. 2 for Rockwell Lime Company. On January 18, 1994, the Department mailed to U.S. EPA, Region V copies of the Department's preliminary determination which included the draft permit for comments.

Rockwell Lime Company received federal and state construction permits for kiln No. 2 in 1978 and 1979. Both permits specify that the maximum sulfur content of the fuel(s) burned in the kiln be 2.1 percent on a 24-hour average. The state permit allows this limit to be met by burning a mix of fuels (gas, coal and petroleum coke). The federal permit however, specified that this limit applies only to coal.

At present time, Rockwell Lime Company is burning a blend of these three fuels in the kiln No. 2. A letter was sent by U.S. EPA (Mr. Dave Kee) to Rockwell Lime Company (Mr. Joe Brisch) on January 1, 1990. Copy of this letter was attached with the preliminary determination. Based on this letter Rockwell Lime Company is considered to be in compliance with the 2.1% fuel sulfur content via fuel blending. Because the federal permit differs from the state permit, Rockwell Lime Company is interested in resolving this difference so that the federal permit is consistent with the state permit. This will assure that Rockwell Lime Company will be allowed to continue burning the fuel blend of gas, coal, and petroleum coke in demonstrating compliance with 2.1 percent sulfur limit.

The proposed draft permit establishes BACT to be the use of fuel blend (natural gas, coal, coke) having a sulfur content of 2.1% as determined on a 24-hour average.

Rockwell Lime Company has indicated in their comments that they would like to demonstrate compliance with the BACT emission limits using a formulae. This formulae is included as part of attachment 1. Rockwell Lime Company will keep records on a daily basis of the amount and sulfur content of the fuels used. This information will be used in showing the compliance with the sulfur limit on a daily basis.

The Department has had several phone discussion with the EPA Region V staff (Mr. Constatine Blatharas) regarding the use of the equation to show compliance with the SO_2 BACT emission limit. One concern brought to our attention was for the need to establish in the permit revision a maximum allowable SO_2 emission limit on a 3-hour basis. This was to ensure that the three hour sulfur dioxide ambient air quality standard would be protected.

Kiln No. 2 is also subject to SO_2 emission limit of 5.5 pounds of sulfur dioxide per million BTU heat input when firing solid fuel per sec. NR 417.07(2)(b), Wis. Adm. Code. At this limit, the kiln would emit 481.25 pounds per hour of SO_2. An air quality modeling analysis was performed at an allowable emission rate to ensure that the three-hour SO_2 ambient air quality standard would still be protected at the maximum allowable limit of 5.5 pounds of sulfur dioxide per million BTU heat input. A copy of the modeling analysis is also included as attachment 2 for your information.

The Department would like to know if EPA would have any concerns if an equation is established in the permit to show compliance with the SO_2 BACT limit of 2.1% sulfur as determined on a 24-hour average. Also the permit will limit them to maximum allowable of 5.5 pounds of sulfur dioxide per million BTU heat input averaged over 3 hour period. This is to ensure that the three-hour SO_2 ambient air quality standard will still be protected.

Currently the facility keeps records of the amount of fuel fired and the sulfur content on an hourly and daily basis. Rockwell lime will continue to keep records to show compliance with both the emission limits which may be established in the permit.

Please provide your comments on the proposed 3 hour emission limits or on the equation for demonstrating compliance with the BACT emission limits at your earliest convenient. Rockwell lime Company is anxious to get the permit as soon as possible. Should you have any questions on this request, please call Raj Vakharia at 608-267-2015.

Sincerely,

Daniel Johnston, Supervisor
New Source Unit
Permit Section

cc: Don Brisch, Rockwell Lime Company
Robert Miller, U.S. EPA Region V
Constatine Blatharas, U.S. EPA Region V
Mike DeBrock, LMD
Raj Vakharia, AM/7

Enclosure

MAX. PRODUCTION: **TONS/DAY** **300**
MMBTU/TON **7.0**

		Totals	Coal	Nat. Gas
CURRENT PERMIT LIMITATIONS	BTU/# or CF		12500	1000
	% SULFUR or #/CF		2.1%	2.9E-05
	# of S/MMBTU		1.68	0.029
	% USAGE		100.0%	0.0%
	FUEL RATE (# or CF/Hr)		7,000	0
	# S/HR	**147.00**	147.00	0.00
	MMBTU/HR	87.50	87.50	0.00
	# of S/MMBTU	**1.68**		

		Totals	Coal	Coke	Nat. Gas
CURRENT COAL-COKE-GAS BLEND	BTU/# or CF		13000	14000	1000
	% SULFUR or #/CF		1.0%	4.2%	2.9E-05
	# of S/MMBTU		0.77	3.00	0.029
	% USAGE		65.5%	30.0%	4.5%
	FUEL RATE (# or CF/Hr)		4,409	1,875	3,938
	COAL/COKE BLEND		70%	30%	
	# S/HR	**122.95**	44.09	78.75	0.11
	MMBTU/HR	87.50	57.31	26.25	3.94
	# of S/MMBTU	**1.41**			

		Totals	Coal	Coke	Nat. Gas
POSSIBLE FUTURE BLEND	BTU/# or CF		13000	14000	1000
	% SULFUR or #/CF		1.0%	4.2%	2.9E-05
	# of S/MMBTU		0.77	3.00	0.029
	% USAGE		6.0%	54.0%	40.0%
	FUEL RATE (# or CF/Hr)		404	3,375	35,000
	COAL/COKE BLEND		11%	89%	
	# S/HR	**146.80**	4.04	141.75	1.02
	MMBTU/HR	87.50	5.25	47.25	35.00
	# of S/MMBTU	**1.68**			

$$\frac{(F_{NG}\times S_{NG})+(F_C\times S_C)+(F_{PC}\times S_{PC})+(F_B\times S_B)}{} \leq$$ 147.0 #S/LY

F_{NG} = Amount of Natural Gas Used (CF)
S_{NG} = Lbs of Sulfur/CF
F_C = Amount of Coal Used (Lbs)
S_C = % Sulfur - Coal
F_{PC} = Amount of Petroleum Coke Used (Lbs)
S_{PC} = % Sulfur - Petroleum Coke
F_B = Amount of Coal/Pet. Coke Blend Used (Lbs)
S_B = % Sulfur - Coal/Coke Blend

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: December 16, 1994

File Code: 4530
FID #: 436034390

TO: Raj Vakharia - AM/7

FROM: John Meier - AM/7

SUBJECT: Air Dispersion Analysis for Permit Alteration of Rockwell Lime Co - Rockwood

A. Introduction

A modeling analysis was completed by John Meier on 16 December 1994. This analysis assessed the sulfur dioxide impacts of a lime kiln at Rockwell Lime Company. The maximum allowable limit for the kiln is 5.5 lbs of sulfur dioxide per million BTU. At this limit, the kiln would emit 481.25 lbs/hour of sulfur dioxide. This air quality analysis was performed to ensure that the three-hour sulfur dioxide standard would still be protected at the maximum allowable if the permit is altered. The facility would like to fire the kiln with coal, coke, and natural gas. Rockwell Lime Company is located near the Town of Rockwood in Manitowoc County. Terrain was not considered in this analysis. The Prevention of Significant Deterioration (PSD) baseline has been set for sulfur dioxide in Manitowoc County as of February, 1979, however this alteration will not result in any increment being consumed as total emissions will not be increased. The Town of Rockwood is in attainment for all criteria pollutants except for ozone. Manitowoc County is a moderate nonattainment area for ozone.

B. Modeling Analysis

1. Raj Vakharia supplied the emission parameters used in this analysis. Building dimensions were taken from plot plan provided by the facility. Please refer to the attached source table.

2. Five years (1983-1987) of Green Bay preprocessed meteorological data was used in this analysis. Both the surface and upper air meteorological data originated in Green Bay.

3. The Industrial Source Complex Short Term 2 (ISCST2) model was used in the analysis. The model used rural dispersion coefficients. The regulatory default option was activated in the model which allows for calm correction, buoyancy induced dispersion, and building downwash.

4. Regional background concentrations were calculated and found to be as follows:

Background Concentrations

Monitoring Site	Pollutant	Time Period	Concentration ($\mu g/m^3$)
Wilson Township Sheboygan	SO_2	3-hr 24-hr Annual	197.5 41.2 9.3

5. A receptor grid of 49 receptors was used in the analysis. The grid was centered on the lime kiln with receptors having 100 meter spacing. Terrain was not considered in this analysis.

D. Model Results

Results show that the sulfur dioxide concentration is below its respective standards.

Pollutant/Time Period	SO_2/3-hr	SO_2/24-hr	SO_2/Annual
Source impact ($\mu g/m^3$)	844	300	14.2
Background ($\mu g/m^3$)	197.5	41.2	9.3
Total ($\mu g/m^3$)	1042	341	24
Air Quality Std. ($\mu g/m^3$)	1300	365	80
% of standard	80%	93%	30%

E. Conclusion

The results of the modeling analysis demonstrate that if the kiln emitted SO_2 at the maximum allowable rate of 5.5 lbs per million BTU, the standards for sulfur dioxide will not be exceeded.

cc: Ralph Patterson - AM/7

TABLE 1

*** ROCKWELL LIME CO - ROCKWOOD ***
*** SO2 SOURCE DATA ***

STACK NUMBER	EMISSION RATE (LBS/HR)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP TYPE=0 (DEG.K)	EXIT VEL TYPE=0 (M/SEC)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. HORIZ DIMEN (METERS)
1	481.25	0.0	0.0	0.0	23.5	533	12.4	1.80	17.10	15.2

TABLE 2

SULFUR DIOXIDE 3-HR HIGH

YEAR	MONTH	DAY	EASTING (M)	NORTHING (M)	CONCENTRATION (UG/M^3)
1983	NOV	27	-200	-100	844
1984	APR	21	-200	-100	813
1985	DEC	01	100	-200	799
1986	NOV	14	100	200	771
1987	APR	02	100	-200	674

SULFUR DIOXIDE 24-HR HIGH

YEAR	MONTH	DAY	EASTING (M)	NORTHING (M)	CONCENTRATION (UG/M^3)
1983	NOV	24	200	50	300
1984	MAR	21	100	-200	250
1985	MAY	12	200	200	221
1986	DEC	03	200	0.0	286
1987	FEB	08	100	-200	275

SULFUR DIOXIDE ANNUAL HIGH

YEAR	EASTING (M)	NORTHING (M)	CONCENTRATION (UG/M^3)
1983	-100	-100	13.2
1984	100	200	14.2
1985	100	200	11.2
1986	100	200	11.1
1987	-100	-100	11.1

Plan Review
Rotary Lime Kiln

4560

July 24, 1978

I. Facility

Rockwell Lime Company
Route 2, Box 124
Manitowoc, WI 54220

Contacts: Joseph G. Brisch - Executive Vice President
Telephone No. (414) 682-7771

Paul Rousseau - The Ducon Company, Inc.
147 East Second Street
Mineola, New York 11501

Telephone No. (516) 741-6100

Reference: Notice of intent dated June 26, 1978 and additional information received on July 3, 1978 and telephone conversations.

II. Source Description

The process involves the calcining of dolomitic limestone into dolomitic lime. Approximately 600 tons of limestone, which is presently being quarried at the existing plant, will be used per day.

Equipment: Fuller rotary kiln with a rated capacity of 250-300 tons/day.
Fuel: Mixutre of coal, petroleum coke, and natural gas.
Control Equipment: Emissions will be controlled by a Duclone Size 2-1025 Type VM Model 700 high efficiency collector followed by a Ducon dynamic scrubber size 126 type UW-4 model 4 with a wet approach Venturi in front of the scrubber. (Manu facturer guarantees that this installation will meet the new EPA regulations.)

Gas volumetric flow rate from kiln is 80,660 ACFM @ 1,034°F. There will be two multi-clone units, connected in parallel with a rated capacity of about 10% to 20% more than the kiln gas flow rate. The scrubber has an integral fan designed to handle 80,660 ACFM @ 1,034°F.

Water will be utilized as the scrubbing liquid. It will be a closed system with a holding pond and therefore no water discharges.

Stack parameters: Height ≃ 36 feet
Diameter = 5 feet
Temperature=154°F
Exhaust gas volume = 44,000 ACFM (Scrubber outlet)
Gas exit velocity = 2,241.47 ft./min. (calculated)

Particulate emission rates from rotary lime kiln prior to the scrubber will be approximately 12.9 tons/day. The cyclone prior to the scrubber will eliminate 75-90% of the solids. The collected solids will be sold for agricultural field lime and the remainder will be disposed of on the property.

Operating schedule is 24 hours/day, 7 days/week.

III. Emissions Analysis

The particulate (PM) emission limitation for lime kilns is set either by NR 154.11(3)(a)1.a. or NR 154.11(3)(b), whichever is more restrictive.

Determining which is more restrictive =

a) NR 154.11(3)(a)1.a. or process weight curve

Process weight rate, $P = \frac{600 \text{ tons/day}}{24 \text{ hrs./day}} = 25 \text{ tons/hr.} = 25 \text{ tons/hr.}$

$E = 3.59P^{0.62}$

$E = 3.59\ (25)^{0.62} = 26.41$ lbs. PM/hr.

b) NR 154.11(3)(b)1.k limits particulate emissions from lime kilns to 0.2 pounds per 1,000 pounds of gas. Converting to lbs./hr.

Exhaust gas volume = 44,000 ACFM @ 154°F.

$$44{,}000 \left[\frac{460+70}{460+154}\right] = 37980.46 \text{ SCFM}$$

$$E = \frac{0.2 \text{ lbs. PM}/10^3 \text{ lbs. gas} \times 37980.46 \text{ SCF/min.} \times 0.075 \text{ lbs. Gas/SCF} \times 60 \text{ min./hr.}}{1{,}000 \text{ lbs. gas}/10^3 \text{ lbs. gas}}$$

$E = 34.18$ lbs. PM/hr.

Therefore, NR 154.11(3)(a)1.a. is more restrictive and is the applicable limitation.

AP-42 Emission factors for rotary lime kilns, per unit of limestone fed:
- Uncontrolled = 340/2 = 170 lbs. PM/ton limestone
- After multiple cyclones = 85/2 = 42.5 lbs. PM/ton limestone
- After secondary dust collection = 1/2 = 0.5 lbs. PM/ton limestone

Using the uncontrolled emission factor and assuming efficiencies of 80% for multi-clone and 99% for Venturi scrubber, the expected emission rate is:

Process weight rate = 25 tons limestone/hr.

$\hat{E} = 25$ tons/hr. x 170 lbs. PM/ton = 4,250 lbs. PM/hr.

$$\hat{E} = \frac{4{,}250 \text{ lbs. PM/hr.} \times 24 \text{ hrs./day} \times 365 \text{ days/yr.}}{2{,}000 \text{ lbs./ton}} = 18{,}615 \text{ tons/year}$$

$\hat{E}_{controlled} = 4{,}250$ lbs. PM/hr. (1.00-0.80)(1.00-0.99)
$= 8.50$ lbs. PM/hr.

Using the after multi-clones and 99% Venturi scrubber efficiency -

$\hat{E}_{controlled} = (25 \text{ tons/hr.} \times 42.5 \text{ lbs. PM/ton})\ (1.00-0.99) = 10.63$ lbs. PM/hr.

Using the after secondary dust collection emission factor -

$\hat{E} = 25$ tons/hr. x 0.5 lbs./ton = 12.50 lbs. PM/hr.

All calculations show that the proposed source can very well meet the emission limit of 26.41 lbs. PM/hr.

IV. Conclusion

Operation of the proposed rotary lime kiln should be in compliance with the limitations set forth in NR 154, Wisconsin Administrative Code.

V. Recommendation

The proposed plan be approved for installation. However, the facility should be informed that said plant is subject to PSD review and approval by the U.S. EPA since lime kilns is one of the listed source categories and the expected potential emissions is greater than 100 tons/year. (EPA Region V has been informed.)

Reviewed by:

Emilia Y. Estrada, Engineer
Engineering & Surveillance Section

EYE:jb
cc: Lake Michigan District - Air Pollution

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF

14 APR 1987

APR 23 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Donald F. Theiler, Director
Bureau of Air Management
Wisconsin Department of
Natural Resources
P.O. Box 7921
Madison, Wisconsin 43216

Re: Rockwell Lime Company
Rockwood, Wisconsin

Dear Mr. Theiler:

Enclosed is a copy of a Notice of Violation issued this date by the United States Environmental Protection Agency to the Rockwell Lime Company for violations of the U.S. EPA PSD construction permit and the applicable New Source Performance Standards at the Rockwell Lime Company rotary lime kiln #2 located in Rockwood, Wisconsin. This Notice has been issued pursuant to Sections 113(a)(1) and (3) of the Clean Air Act, as amended, 42 U.S.C. Sections 7413(a)(1) and (3). Section 113(a)(1) provides in part:

> Whenever, on the basis of any information available to him, the Administrator finds that any person is in violation of any requirement of an applicable implementation plan, the Administrator shall notify the person in violation of the plan and the State in which the plan applies of such finding.

Specifically, rotary lime kiln #2 at the Rockwell Lime Company, located in Rockwood, Wisconsin, is in violation of the U.S. EPA PSD construction permit and 40 CFR 60.343, and a compliance schedule has not been approved for this source.

If the violations continue, we will take appropriate further action in accordance with Section 113 of the Clean Air Act. It is our hope that this notification will substantially aid efforts to obtain immediate compliance, thereby obviating the need for further Federal action.

Sincerely yours,

for David Kee, Director
Air and Radiation Division (5AC-26)

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION V

IN THE MATTER OF:	)	
	)	NOTICE OF VIOLATION
Rockwell Lime Company	)	
Rockwood, Wisconsin	)	EPA-5-87-A-44
	)	
Proceeding Pursuant to	)	
Sections 113(a)(1) and (3)	)	
of the Clean Air Act, as	)	
amended [42 U.S.C. Sections	)	
7413(a)(1) and (3)]	)	

STATUTORY AUTHORITY

This Notice of Violation is issued pursuant to Sections 113(a)(1) and (3) of the Clean Air Act, as amended [42 U.S.C. Sections 7413(a)(1) and (3)]; hereinafter referred to as the "Act."

FINDINGS OF VIOLATION

The Administrator of the United States Environmental Protection Agency (U.S. EPA), by authority duly delegated to the undersigned, finds:

1. On September 27, 1979, the U.S. EPA issued a construction permit to Rockwell Lime Company pursuant to the regulatory requirements for Prevention of Significant Deterioration (PSD), as provided under Part C of the Act, for the construction of rotary lime kiln #2. This PSD construction permit is part of the applicable implementation plan for the State of Wisconsin.

2. On April 26, 1984 (49 Federal Register 18080), the U.S. EPA promulgated New Source Performance Standards for Lime Manufacturing Plants for which construction commenced after May 3, 1977. These standards were revised on February 17, 1987 (52 Federal Register 4773).

3. Rotary lime kiln #2 at Rockwell Lime Company, located in Rockwood, Wisconsin, was constructed after May 3, 1977.

4. The U.S. EPA PSD construction permit limits the opacity of emissions from the rotary lime kiln #2 baghouse to 10%, and requires that, in accordance with 40 CFR 60.7(c) and 60.343(e), quarterly reports be submitted to U.S. EPA which identify all 6-minute periods during which the average opacity is 10% or greater.

5. Between April 26, 1984 and February 17, 1987, 40 CFR 60.343 required Rockwell Lime Company to either install, calibrate, maintain and operate a continuous opacity monitoring system on rotary lime kiln #2, or to monitor visible emissions from rotary lime kiln #2 at least once per day of operation by using a certified visible emissions observer.

6. As of February 17, 1987, 40 CFR 60.343 requires Rockwell Lime Company to install, calibrate, maintain and operate a continuous opacity monitoring system on rotary lime kiln #2.

7. Rockwell Lime Company is in violation of the U.S. EPA PSD construction permit and the requirements of 40 CFR 60.343, as summarized below:

   - Since September 27, 1979, Rockwell Lime Company has not submitted quarterly reports, or any other reports, to U.S. EPA.

   - Since April 26, 1984, Rockwell Lime Company has not installed a continuous opacity monitoring system on rotary lime kiln #2, nor has it monitored visible emissions daily using a certified visible emissions observer.

NOTICE OF VIOLATION

The Administrator of the U.S. EPA, by authority duly delegated to the undersigned, notifies the State of Wisconsin and the Rockwell Lime Company that the facility described above is in violation of the applicable implementation plan and the applicable New Source Performance Standards as set forth in the Findings of Violation.

Date 14 APR 1987

/s/ David Kee, Director
Air and Radiation Division (5AC-26)